THE CONDOR

A Magazine of Western Ornithology

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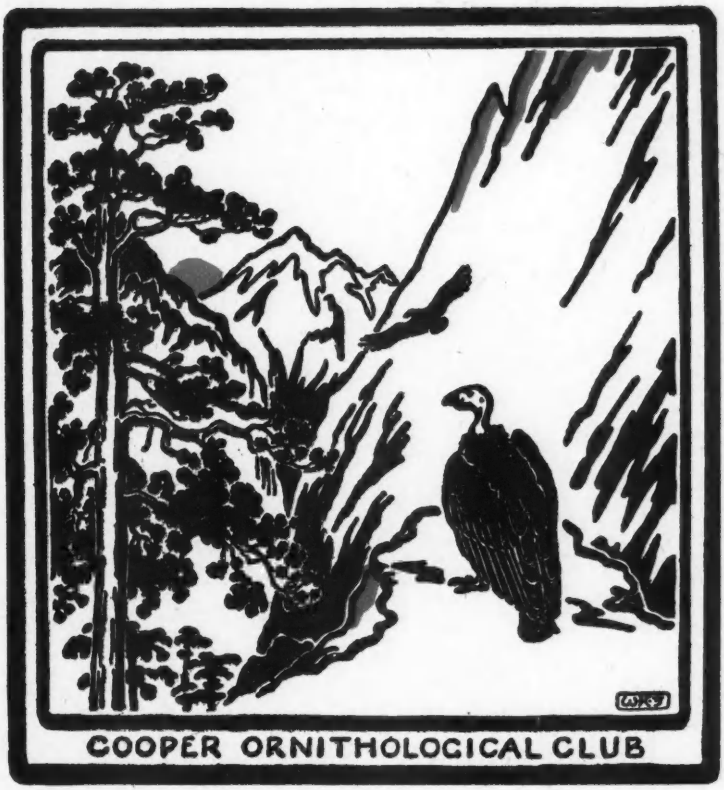

THE CONDOR

A Magazine of Western Ornithology

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CONTENTS

	PAGE
Oceanic Currents and the Migration of Pelagic Birds (with three ills.)—*S. C. Brooks*	185
Notes on the Xantus Tradition (with three ills.)—*Harry Harris*	191
Bird Notes from Southern Arizona—*Berry Campbell*	201
The Vocal Apparatus of Some North American Owls (with one ill.)—*Alden H. Miller*	204
The Classification of Some American Pigeons—*James L. Peters*	213
FROM FIELD AND STUDY	
Feeding Habits of Herons on Mission Bay, California—*Chas. W. Michael*	215
Notes on the Nesting of the Band-tailed Pigeon—*J. Stuart Rowley*	216
Magpie Spends Second Winter at Florence Lake—*Lila M. Lofberg*	217
Miscellaneous Notes on Birds of the Sacramento Valley—*Johnson A. Neff*	217
The Race of Cowbird in the San Francisco Bay Region—*J. Grinnell*	218
The Cowbird Breeds in Berkeley—*Seth B. Benson* and *Ward C. Russell*	219
The Nesting of the Double-crested Cormorant at Lake Bowdoin, Montana (with one ill.)—*V. L. Marsh*	219
The Status of Phalaropus fulicarius jourdaini Iredale—*F. C. R. Jourdain*	220
Further Comment on Phalaropus fulicarius jourdaini—*James L. Peters*	220
New Bird Records from the Pleistocene of Rancho La Brea—*Lawrence V. Compton*	221
NOTES AND NEWS	222
Charles Dean Bunker (portrait)	222
MINUTES OF COOPER CLUB MEETINGS	224

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A BI-MONTHLY MAGAZINE OF
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VOLUME XXXVI | SEPTEMBER-OCTOBER, 1934 | NUMBER 5

OCEANIC CURRENTS AND THE MIGRATION OF PELAGIC BIRDS

WITH THREE ILLUSTRATIONS

By S. C. BROOKS

The naturalist who voyages on the great oceans can usually escape much of the supposed monotony of the trip by watching the life in or over the water. But if our naturalist be eastbound on the main North Atlantic ship lanes he is likely to find that wild life fails him about the third day out, and until the crossing is nearly over he may sunburn himself all day for a paltry storm petrel or two. On almost any ocean there is day after day when scarcely a bird, beast, or fish appears to break the monotony, and contrasted with this, here and there a few minutes or hours of teeming abundance, when every field of the binoculars shows a dozen birds or a hundred, and porpoises, orcas, or that cynosure of all passengers' eyes, "real whales," are seen on every hand. Why should things be so badly arranged?

The reason is not far to seek if one looks upon the ocean not merely as an open space for birds to fly around on, but as one organic whole with its own geography which is inseparably intertwined with the life in and upon it. This is likely to escape attention, and many ornithologists with passerine predilections might well, as did the writer at first, accept with resignation the lean with the fat, all as ordained by an inscrutable Providence, and thus miss the real beauty of the picture unrolled before his eyes. Although the general picture is seen by many sea-going naturalists and most oceanographers, it is perhaps here not out of place to outline for the terrestrial ornithologist some of the larger relationships involved.

It has been the writer's good fortune to have made in recent years several ocean voyages, including five across the North Atlantic and several on or across the Pacific. As a strictly amateur ornithologist he has had much to learn, and much cause for bewilderment, but in the course of these voyages the broader relationships have gradually impressed themselves upon him, until they have come to be a really absorbing study. In this gradual emergence of a new point of view, the writer owes a great deal to the interest and many courtesies accorded by officers and men of many ships, and especially to Officer Germayne, then of the R M S "Makura", who really supplied the key to the whole problem by pointing out the relationships at the Pacific equatorial margins.

These relationships are well seen by one who makes the trip from San Francisco to Tahiti. Embarking in the late afternoon, he sees for the rest of the day the

gulls and cormorants, the auklets, murres, and guillemots, which are sure signs of proximity to land. The next morning he may still see a few stray gulls, and by dint of patient watching perhaps also a storm petrel or two, which only long familiarity can help him to identify more closely. [The book "Birds of the Ocean" by W. B. Alexander (Putnam's, 1928, New York and London), has been found a valuable aid, especially in the Pacific area.]

Then there may be five or six days during which the most faithful watching will yield only here and there a storm petrel, or, especially toward the last, an increasing abundance of flying fish and rarely a lonely petrel or a tropic-bird or two. Then within a few degrees of the equator, the scattered cumulus clouds become thicker and grayer, a confused swell makes up, rain squalls come and go, and birds appear. At first there is only a greater abundance of storm petrels, with here and there petrels of other kinds hunting along utterly indifferent to the ship, or small groups of tropic-birds flying along with the ship, off to one side or high overhead. Then scattered groups of various petrels appear, and finally for an hour or two there are birds on every hand. If one is not too far from land, a few hundred miles perhaps, as in the case of the south equatorial drift north of the Marquesas, one may also see multitudes of sooty or crested terns. Occasionally one sees the grayish blue form of a shark gliding along, or a big purplish-brown hammerhead lazily twisting around as though trying to get a better view of the ship. Flying fish, while not so closely localized as the birds, are breaking the water every few seconds, and bewitch the beholder by their myriad sizes, shapes, and antics, and their bewildering patterns and shades of deep brown, opal blue, yellow and purple. Then the sun comes out again, the sea takes on its deep tropical blue, the birds become more and more scarce, and gradually, as the ship moves on, the ocean resumes its desert aspect.

If it were daylight all the time, this same sequence might be seen in a more or less striking fashion twice or perhaps even three or four times. Inquiry soon reveals that this sequence marks the time of passing the edge of one of the great currents. There are three of these to be crossed: the two westerly equatorial drifts, driven by the constant "trades", and between them the counter-equatorial current carrying part of the piled up waters back eastward. Where two such oppositely flowing currents touch, there is always turbulence which stirs up the deeper waters and tends to bring them to the surface. [For a simple discussion of oceanic circulation and its causes the reader may be referred to J. Johnstone's "An Introduction to Oceanography" (Boston, Small, Maynard & Co., 1923). A more detailed treatment will be found in Bull. Nat. Research Council, 1932, No. 85.]

Under some conditions this upwelling of ocean waters is sufficient to bring to the surface great masses of deep water which is rich in dissolved nutriment: mainly nitrates and phosphates. Just here begins the food chain which culminates in the bird life which is so conspicuous. This is what happens at the boundaries between the equatorial and counter-equatorial currents, and to a lesser extent at the outer margins of the former. The upwelling water has been cold, dark, and perhaps lacking in oxygen—hence barren; but let it have the warmth and sunlight of the tropics and it will blossom with countless billions of microscopic plants, the phytoplankton; and with this come countless billions of zooplankton—animals which feed upon the phytoplankton and upon each other. From these on, by devious paths, the food chain of prey and captor leads up to the flying fish, the sharks, the whales, and the birds. That is why one usually sees these obvious forms most abundantly where great ocean currents meet.

In the North Atlantic ship lanes the same play is staged with different actors.

Instead of the equatorial currents there are the Gulf Stream and its continuation, the North Atlantic Drift, and the Arctic Current; instead of confused swell and squalls of rain there are slicks and fogs. Tropic-birds are replaced by jaegers and skuas; and different species of the petrel group, usually here spoken of as shearwaters and fulmars, are flying or swimming about, often in great flocks. The dry twittering of phalaropes and the white flash of their bellies as they rise from the water and make off to either side seem more appropriate to shore birds on a sandy beach or salt

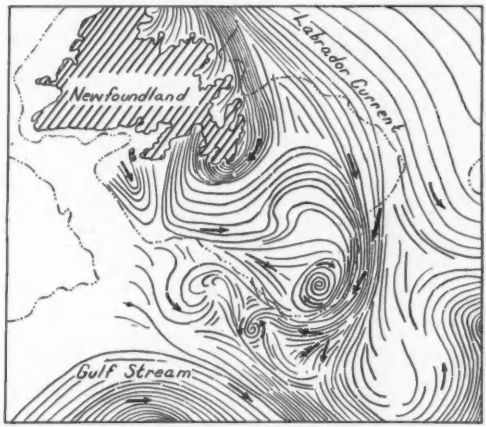


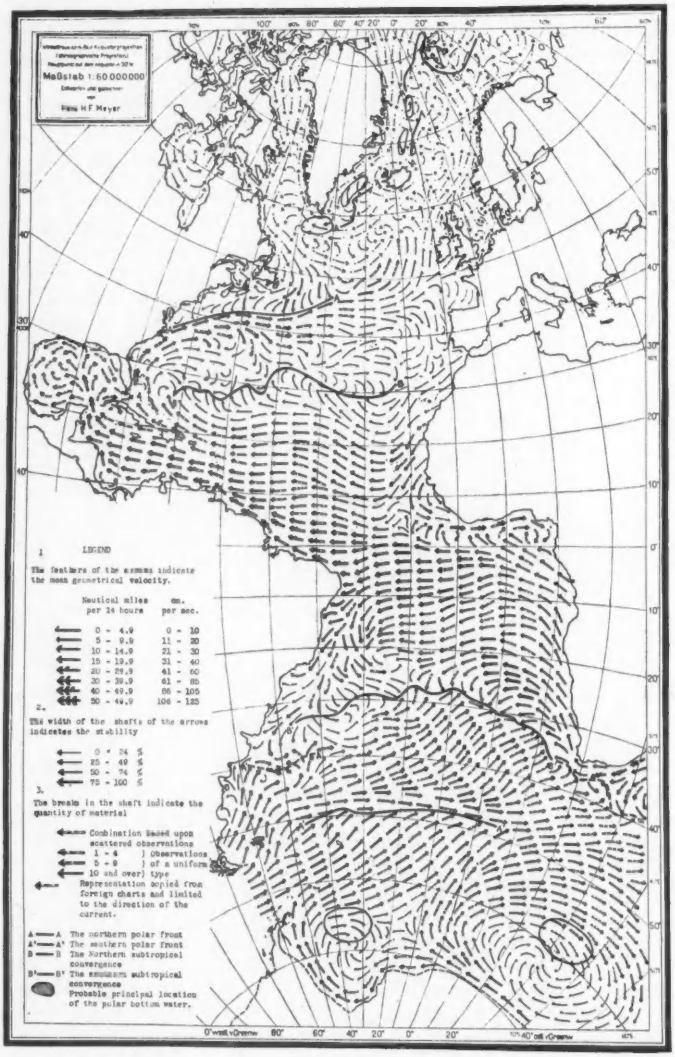
Fig. 31. Surface currents in the vicinity of the Grand Banks and Newfoundland. (After Smith, 1924.)

marsh than they do to the mid-ocean. Scattered swallow-tailed and arctic terns replace the flocks of sooties and crested terns. Here too, perhaps, one sees less of sharks and more of porpoise racing with the cut-water or doggedly hurrying, school after school, toward some unguessable objective. The flashing black and white of the young orcas, or the distant sudden spurt and lazy drift of a whale's spouting, lend life to the water, as do the antics of flying fish, distant though they be from their traditional home in the tropics.

But the underlying plan is the same. Where the Arctic Current meets the Stream there is a complex and shifting system of currents and eddies (see fig. 31), with turbulence and upwelling. There one may pass from the blue water of the Stream, with floating gulf weed (*Sargassum*), and perhaps here and there the iridescent float of a Portuguese man-of-war, into the gray-green water of the Arctic Current with its thousands of jelly fish, and in a few hours back again into the Stream. Each time, at the margin, one is likely to see the surface display of that abundance of life which has made the Grand Banks one of the great fisheries of the world.

It is not always true of the North Atlantic ship lanes, as it is of the eastern Pacific, that most of the ocean appears wholly desert. Here the complications of dilution by rain or melting ice, evaporation, summer warming, and winter cooling, and the tendency of ocean currents to deviate to the right in the Northern Hemi-

sphere—all of these determine a complex circulation in which upwelling occurs and conditions for plankton growth are often favorable. The complexity of the circulation may be seen in figure 32.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Hans H.F. Meyer
LEGEND
The feathers of the arrows indicate the mean geometrical velocity.
Nautical miles per 24 hours
cm. per sec.
0 - 4.9 0 - 10
5 - 9.9 11 - 20
10 - 14.9 21 - 30
15 - 19.9 31 - 40
20 - 29.9 41 - 60
30 - 39.9 61 - 85
40 - 49.9 86 - 105
50 - 49.9 106 - 125
The width of the shafts of the arrows indicates the stability
0 - 24 %
25 - 49 %
50 - 74 %
75 - 100 %
The breaks in the shaft indicate the quantity of material
Combination based upon scattered observations
1 - 4 } Observations
5 - 9 } of a uniform
10 and over} type
Representation copied from foreign charts and limited to the direction of the current.
A — A The northern polar front
A' — A' The southern polar front
B — B The Northern subtropical convergence
B' — B' The southern subtropical convergence
Probable principal location of the polar bottom water.

Fig. 32. Surface currents of the Atlantic Ocean in February. Note particularly the polar fronts: A-A and A′-A′, and the subtropical convergencies: B-B and B′-B′. (After Meyer, 1928.)

Accordingly, it often happens that birds, especially kittiwakes, may be encountered in fair abundance all across the Atlantic north of the fortieth parallel. This is well shown in figure 33, which is redrawn after figures given by Jesperson (1926, 1930), in his paper "On the Frequency of Birds Over the High Atlantic Ocean." Other papers show the same general picture (Nicholson, 1928; Nicholson and Nicholson, 1931).

Jesperson's papers are particularly interesting because of his simultaneous determinations of the abundance of birds and of the larger plankton forms. These larger forms were scarce where birds were scarce, and abundant where birds were most frequently seen. Figure 33 shows how this abundance of food organisms, as shown by the type of shading, is everywhere correlated with the abundance of birds. Many readers will recall that where the Humboldt Current is diverted to the left by the earth's rotation as it flows north along the Peruvian coast there occurs this same correlation of the upwelling of fertile ocean water, abundance of plankton, and myriad birds—the source of the famous guano of commerce (Murphy, 1923).

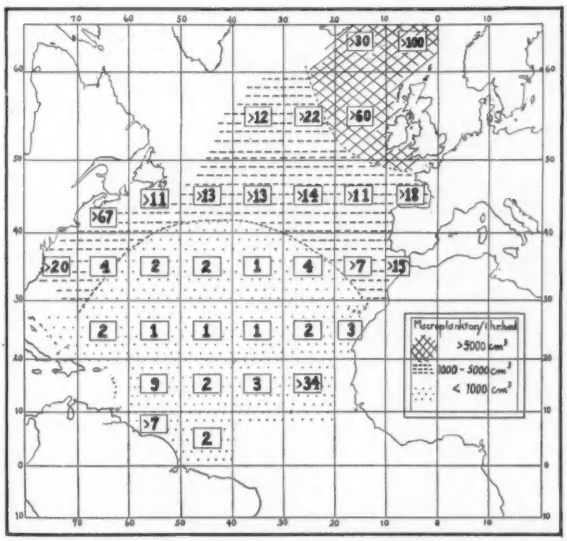

Fig. 33. Distribution of macroplankton and bird life in the North Atlantic. The abundance of plankton in each 10° square is shown by the shading, and the average number of birds seen per day is given by the figures in the corresponding squares. The sign > means that birds were seen in flocks and probably numbered more than the figure given. (After Jesperson, 1926 and 1930.)

Confining one's travels to regular ships' lanes one sees only here and there a cross section of some branch of a larger distribution. Could one but map at different seasons the distribution of different species, and especially could one learn the type and abundance of their food, what might one learn as to their migrations! How are they led to move from their breeding grounds out over the trackless ocean,

often literally thousands of miles from land, and back again, perhaps to some one tiny island, the recurrent focal point of their wanderings? A remarkable example of such behavior is the shy albatross (*Thalassarche cauta eremita*), a subspecies which musters only a hundred or so individuals, which scatter over the Pacific in winter, but return to Pyramid Island in the Chathams to breed (Murphy, 1930). The drifts of food, which are not merely haphazard but rather in their turn more or less regularly determined by seasons and ocean currents, may well be factors in guiding migrant birds where all other landmarks seem to be lacking. When the sooty terns, for example, were taken from Bird Key in the Tortugas and liberated off Cape Hatteras, did the rich feeding grounds along the margins of the Gulf Stream play any part in guiding them back? Perhaps other factors too must be considered, such as the density of the air, which Jones (1926) regards as the thing which determines the northerly limits for the Wandering Albatross.

These questions challenge the imagination and make an ocean voyage for the ornithologist a much more exciting and profitable thing than the mere tabulation of daily observations, or even the seeing of unfamiliar species. Here is a problem worthy of the best thought that can be given it.

So the ornithologist at sea, whether he be on regular lanes or cruising less frequented waters, should look upon the ocean as a whole. He should study its waters, their chemistry, their flow; the life in them as well as over them. For thus will he come to see, with previously unimagined variety of scenes and actors, the drama of the life of the ocean.

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University of California, Berkeley, June 6, 1934.

NOTES ON THE XANTUS TRADITION

WITH THREE ILLUSTRATIONS

By HARRY HARRIS

To the present school of historians who are cultivating so assiduously and with such fruitful results the fertile field of southwestern history, the activities of John Xantus in California and Mexico during the late fifties and early sixties seem to be but little known, or at least until quite recently they have been the source of but casual interest. This may be the result of the historical scholar's congenital distaste for natural history, in which field Xantus' American reputation is known to have been won, or it may be attributed to the superlative rarity of the two Hungarian books containing the only published account of his American experiences. The fact that these scarce books are printed in the most difficult of all European languages, and that efforts have only recently been made to render parts of them into English, may further account for the almost mythical nature of the Xantus tradition on this side of the Atlantic.

The man, however, is well known to American ornithologists as an important contributor to the development of their science on the west coast, and specialists in other branches of zoological science have had occasion at one time or another to scrutinize closely the Xantus itinerary in connection with new or little known material collected by him. The archives of the United States National Museum contain a wealth of manuscript material in evidence of his character as an educated gentleman and of his attainments and zeal as a votary of natural history in general and of ornithology and botany in particular. There is additional manuscript matter in the Bancroft Library in Berkeley which sheds some light on his relations with the well-known California naturalist Andrew J. Grayson. In view of the fact that the importance of Xantus as a minor historical figure awaits recognition, and that his two Hungarian books cannot fail ultimately to prove of great interest to local historians and ethnologists, it seems not malapropos at this time to place on record at least a sketch of his American adventuring.

Louis John Xantus de Vesey was born of a noble family in Csokonya, Hungary, October 25, 1825; and he died in Budapest on December 13, 1894, in his seventieth year. His is an honored name in his native country to which he did not fail to contribute some luster, and while it will be perpetuated in the annals of Hungary as typifying patriotism, scholarship, and scientific attainment, he made himself most widely known as a great wanderer in frontier America, and his fame at home rests chiefly on his giving to his native literature its first intimate knowledge of the two Californias.

He was educated at the Polytechnical School in Vienna, where he was grounded in the natural sciences and civil engineering that later during the years of his enforced exile in America opened the way to his profitable and congenial relationship with the Smithsonian Institution, as well as to the most welcome opportunity of exploring, and amassing huge natural history collections in virgin fields. After his graduation he entered at once on the customary European military service, receiving a commission in the Royal Austrian Artillery, and soon thereafter he threw himself wholeheartedly into the rebellion of 1848-49 in support of his beloved Hungary. At the termination of the war, so disastrous to the hopes of Hungarian patriots, the leader Kossuth and those of his followers who were fortunate enough to escape the imperial wrath of Austria fled to sanctuary in foreign countries. John Xantus was among

the rebel officers who by their prompt flight saved themselves certain execution, and with a group of these refugees he made his way through England to America where he landed early in 1851. In an official letter to Washington dated at Fort Tejon, California, November 16, 1857, he throws some light on this early period of his American peregrinations. He says:

> When in 1848 the unfortunate war broke out against Hungary, I resigned my commission, but it was not accepted. I left my garrison notwithstanding and offered my services to the Hungarian Secretary of War, who accepted readily and entrusted me with an important mission. The Austrian Government ordered the sequestration of my property... . But I think I did my duty, and never cared much about material hopes... . I came to this country amongst the first of my countrymen, and in advance of Kossuth, and by order of President Fillmore I received a grant of land in Iowa, as [did] the others of my fellow refugees. But actually I never took possession of it, but being a good piano player, and a tolerable draughtsman, I procured an honorable support by teaching for a short time; when I went successively with the Prince of Wurtemburg, Dr. Wagner and Sherzer, and Dr. Kreyer as collector. At last I fitted out of my hard earnings an expedition into North Minnesota, which failed so entirely, that in a moment of utmost despair, and under circumstances completely beyond my control . . . I was forced to enter the American army.

This letter contains the only accessible information bearing on the earliest period of his career in America, and is the only known reference to the Minnesota expedition. Details of events subsequent to this time and prior to the enlistment referred to, which is believed to have been in 1855 shortly before he entered into correspondence with Prof. Baird, may be drawn from the volume of published letters already mentioned. This book, of which there are but three known copies on the Pacific coast (in the private libraries of Henry Raupp Wagner, Robert E. Cowan, and W. Lee Chambers), was published in Budapest in 1858 under the title (translated):

> Letters of John Xantus from North America. With twelve lithographs made from original drawings and with a few woodcuts. Edited by Stephen Prepost. Budapest, Lauffer and Stolp, Publishers and Booksellers. [The title-page is undated, though on those copies that have the printed cover title the date 1858 appears.]

The letters, 37 in number, are addressed to members of his immediate family, chiefly to his mother, and are dated from various points extending from New Orleans and the Gulf to Iowa, and from the Indian infested frontier on the great plains to New York City, and the collection ends with four letters from California. The period covered is from December 1, 1852, to July 5, 1857. They constitute an intimate and lively running account of daily routine, itinerary, comments on flora and fauna, and voluminous ethnological notes. While an abounding enthusiasm for natural history, as well as for everything connected with Indian life, is often enough indicated, his more intimate experiences with rare birds and other animals known to have been collected by him are almost entirely lacking. He mentions more than once his serious intention of publishing in New York or Philadelphia a treatise on the plains Indians, and indeed his careful accumulation of material to this end warranted such an undertaking, though nothing came of it.

The only letter of this collection that has thus far been translated has recently been published in the Quarterly of the Southern California Historical Society, and its extreme interest has led the writer to strenuous effort to ascertain the contents of all the others in the volume. To the generous courtesy and scholarship of Dr. Josephine von Karman, a cultured Hungarian lady now resident in Pasadena, we

are greatly indebted for the translation which has furnished most of the matter for the following brief account. It may be said parenthetically at this point that the printing of the correspondence in this form was so displeasing to Xantus that he went to the length of explaining the matter in the preface of his second book, the *Utazas*, published in 1860. Thus he says:

> A few months ago a book was published by the firm of Lauffer and Stolp of Pest titled "The Letters of John Xantus from North America." The greater part of it, i.e. the letters, were not meant for the general public. I did acceed to the publication of these letters under certain conditions, but these conditions were not properly complied with... . The publishers, not knowing my set conditions for the publication of the first work, bought the manuscript and published it in all good faith. A later agreement with me gave them full publishers' rights.

The matter after all may have had more of a financial significance than any other.

Late in 1852 Xantus had joined a party of privately employed engineers engaged in a preliminary survey for a railroad route contemplated to extend from St. Louis, Missouri, to the Pacific Coast in California. Work was begun about 150 miles west of the Missouri line and continued on to some point in the wilderness of western Nebraska, when severe winter conditions and a shortage of supplies made it necessary for a relief party to be sent ahead to Fort Laramie. Acting in the capacity of topographer-draughtsman, in charge of the commissary and of hunting operations, he was given command of this party of thirty or more men. A somewhat confused and quite puzzling account of his difficulties in reaching the Fort seems to indicate that he had continued on to Oregon and Fort Vancouver, but this reflects merely a hazy knowledge of western distances and geography which led him to see in the shorter journey all the far western landmarks he had doubtless heard much about.

In his last communication from Fort Laramie, dated January 4, 1853, he states that the plans of the railroad company had undergone a radical change and that the surveying party to which he was attached had been given another objective. They were ordered to travel south and then southeast "through territory not before explored by white men and to reach Fort Washita, on the Red River of Texas, in about a month, from which point the road to Salt Lake was to be surveyed." The journey was evidently accomplished on schedule, though the company's plans undergoing still further changes the party was directed to report to New Orleans and await orders. His casual reference further along in the correspondence to his having been in New Mexico and Utah cannot refer to this period of his travels, nor can the dates of such a visit be placed by any known writing by or about Xantus.

While marking time in the southern city he gave serious and thoughtful consideration to an offer made him at the time of his arrival there to join an extensive scientific exploration of Central and South America and the Pacific coast under the joint auspices of the British Museum, the Paris Academy, and the New York Natural History Society. Twenty countries were to be explored and surveyed, and this was considered by him to be a wonderful opportunity to assemble large and representative collections for the National Museum in Budapest. The future of the railroad project intriguing him for the moment as offering better prospects, he accepted instead the position of draughtsman in the St. Louis office of the company, and about the middle of May boarded the Mississippi River steamboat *St. Nicholas* to report for duty in the Missouri metropolis. Unfortunately the *St. Nicholas* was destined to be the loser in one of those traditional tests of speed so common between rival steamboats on the Mississippi during that glamorous period, and shortly after leaving Natchez the boilers of the *St. Nicholas* proved less equal to the extra strain

than those of the *General Scott*, the result being, according to a literal translation of Xantus, that the boat he was on "fell into the river." Fortunate enough to escape serious injury he was able to swim the wide stream to the opposite shore where he spent the night in a tree. Making his way on foot next morning to Natchez where

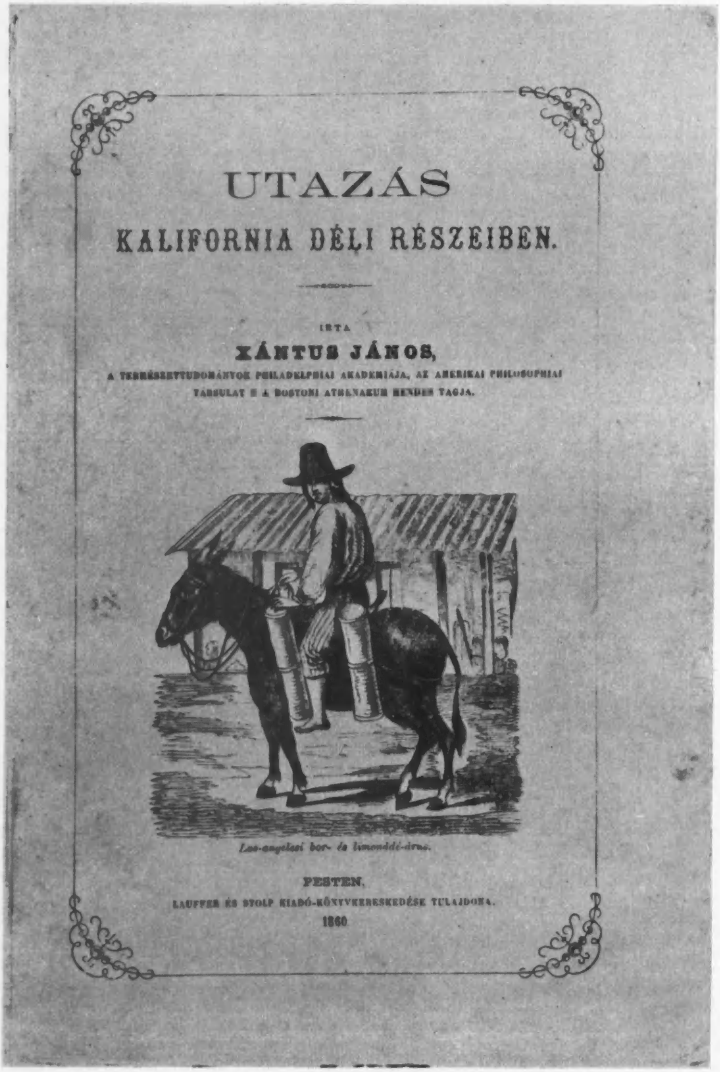

Fig. 34. Cover title of Xantus' "Travel."

he quickly recovered from his bruises, he returned to New Orleans only to fall a victim of yellow fever from which in time he entirely recovered.

At this point, during the summer of 1853, occurs one of the gaps in the narrative. He mentions accepting a professorship in the Louisiana State University after being dissuaded by influential friends from again embarking for St. Louis. He looked forward with satisfaction and great pleasure to settling down to the quiet routine of a teacher of languages, not the least advantage of which was to be nine hundred dollars a year with room and board. However, this pleasant prospect soon gave way to the rosy dream of developing a full section of Texas land into a sort of model estate to be patterned after the most approved Hungarian standards, and he invited his family to join him as quickly as possible. This project in its turn also was abandoned, and a plan to enter some line of mercantile business in New Orleans following the great fire of February 4, 1854, was likewise given up owing chiefly to an epidemic of malaria.

During the spring of 1854 he lived for a time, probably not more than a few weeks, with the lighthouse keeper on one of the smaller islands of the Chandeleur Group in the Gulf of Mexico. Here he collected birds daily "between the hours of 3 and 8 A.M." He had doubtless been led to this insular collecting ground through shooting and observing birds on the mainland coast some 92 miles northeast, as repeated reference is made to visits in the region of Biloxi, Mississippi. The destination of the birds collected during this period is not disclosed, though they were probably sent to Europe, since there is no evidence that he had yet entered into correspondence with either the Smithsonian Institution or the Philadelphia Academy.

On his return to New Orleans from the island early in the summer he decided suddenly on a visit to the Hungarian settlements in south-central Iowa where, in the neighborhood of Decatur, many of his fellow exiles had accepted grants of land from the Government. No incidents of the voyage up the Mississippi to St. Louis are recounted; but at that point, instead of continuing on by boat to Burlington, Iowa, as contemplated, his impatience resolved him to buy a horse and proceed directly overland "straight through the prairies." It may be inferred that this decision was reached through a desire to resume under favorable and widely different conditions his recently interrupted collecting of birds. While there is no specific reference to substantiate this inference, a full account of his adventures includes mention of the excellent hunting in several regions traversed.

After spending several months in the congenial company of his many Hungarian friends scattered throughout southern Iowa, during which time his financial reserve was reaching a low level, he expressed the hope that his work of surveying the boundaries of Kansas would start "next month," that is, in December, 1854. This was evidently the time of his decision to seek employment in one of the several Government surveys then in the field, though in no place throughout his entire correspondence does he confide to his people that he was forced to the expediency of enlistment in the United States army. At this point there follows a gap of about four months in his letters, and it is known from Prof. Baird's memorandum, cited in full later, that some time during 1855 he entered the Medical Department of the army. To whatever branch of the service he may have been assigned under the terms of his enlistment, it is clear enough from his extensive and minutely detailed account of this period that he was constantly in the field on both the west and south frontiers of Kansas Territory, engaged exclusively on boundary survey work. Often he was detached from his regular routine as a map draughtsman and given command of exploring parties sent out in search of headwaters, or to examine and map the

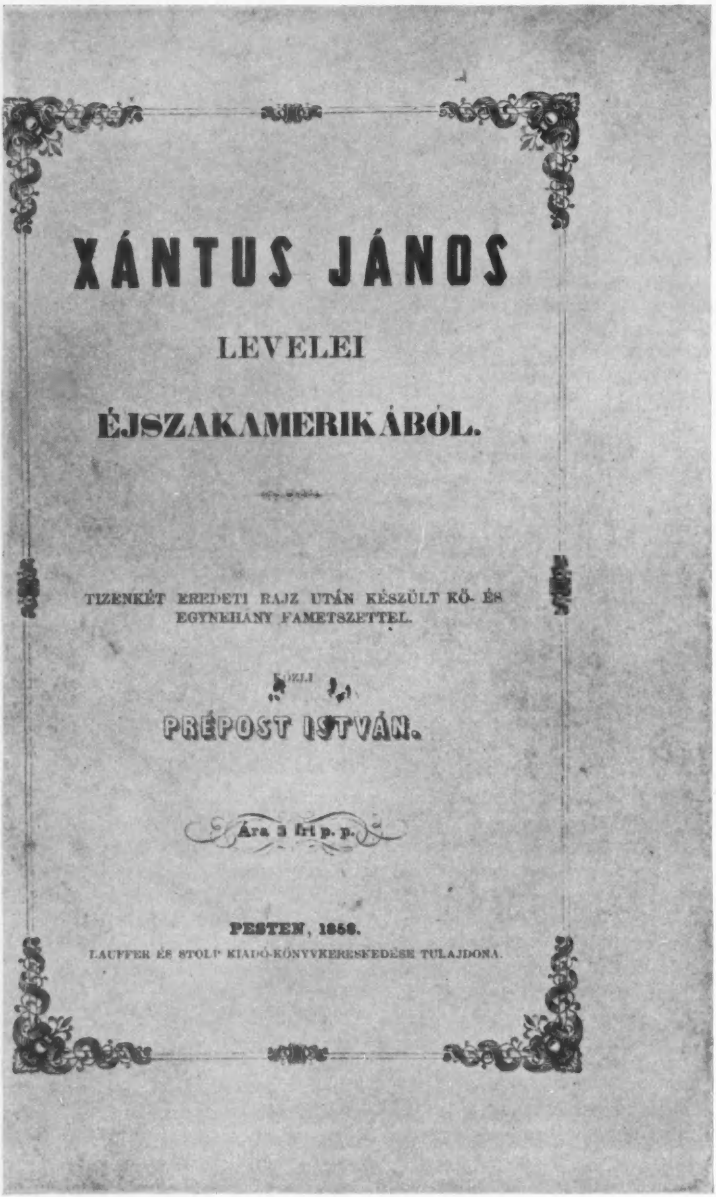

Fig. 35. Title page of Xantus' "Letters."

topography of unknown terrain. During these welcome diversions he was as constantly alert for new and rare zoological and botanical material as he was for hostile Indians.

Responsibilities entrusted to him during the two years of this survey, as well as at other times on the west coast and later in Washington, indicate his possession of superior resourcefulness and other estimable qualities. It was early in this period, in the summer of 1855, that Prof. Baird first learned of the matchless skill and diligence of Xantus as a collector of natural history specimens, and there followed a correspondence between the two that lasted at least six years and perhaps longer. Encouraged and stimulated by this contact, Xantus made full use of his opportunity to assemble great quantities of miscellaneous scientific collections for the National Museum. In one instance during the summer of 1856, while on a distant and dangerous reconnoissance which took him as far south as the Wichita Mountains in what is now southwestern Oklahoma, he mentions having all the empty wagons filled with the collections which were to be forwarded to Washington.

At the first opportunity on his return to the Fort Riley headquarters early in the fall he compiled for his mother in great detail a voluminous résumé of this exploration. The report reflects an intimate and sound knowledge of all branches of zoology, botany, and ethnology, and besides it constitutes an historical document of great interest and value.

Early in the spring of 1857, after nearly two years spent in the wilderness, Xantus had completed his work on the survey and on March 9 he boarded the Missouri River steamboat *Admiral* at Fort Leavenworth on the initial leg of his journey to Washington, D. C. By this time his reputation in several fields of activity was well established, and, choosing to continue in the service, he was offered in Washington his choice of joining the topographical staff then operating in Oregon, or of being assigned to one of the survey groups at that time being organized for field duty in both California and on the Mexican boundary line. Electing to join one of the California parties, one of the deciding factors in which choice being his expressed desire to marry and settle down in that distant and favored region, he proceeded to take what advantage he could of the two weeks remaining before the time set for sailing from New York. He found time to attend a meeting of the Philadelphia Academy of Natural Sciences in order personally to acknowledge his election to membership, and he was at this time further honored by election to membership in the American Philosophical Society and in several other learned bodies. He was presented to President Buchanan, with whom he was privileged to discuss the problems and needs of Hungarian immigrants in America, with the happy result that the President committed himself to certain promises in the matter.

We learn further from his Washington letters that he was affectionately and perhaps significantly referred to by his many friends as Uncle John, and it can well be imagined that Uncle John was a congenial and much esteemed personality. He mentions having a lot of fun in Washington, though he omits mention of his personal contacts with Professor Baird and others of the Smithsonian staff with whom he was constantly in communication while in the field.

Sailing on the *Illinois* from New York on April 6, 1857, the Government party of about 200 men reached San Francisco, *via* the Isthmus and the Pacific steamer *Golden Gate*, on April 30. Five days later, Uncle John received a six weeks leave of absence which he characteristically used by striking off immediately into the wilds of Oregon on a solitary hunting and exploring expedition, returning overland on muleback. The letter containing the interesting account of this trip is the one

recently published in full by the Southern California Historical Society in the current issue of its Quarterly. It is hoped that enough interest may be aroused in Xantus as a result of this publication to warrant printing other letters in the collection.

Of the 185 men of the surveys assembled finally at Los Angeles, 50 were assigned to locate boundaries in the Mesilla Valley and the Gadsden Territory purchased

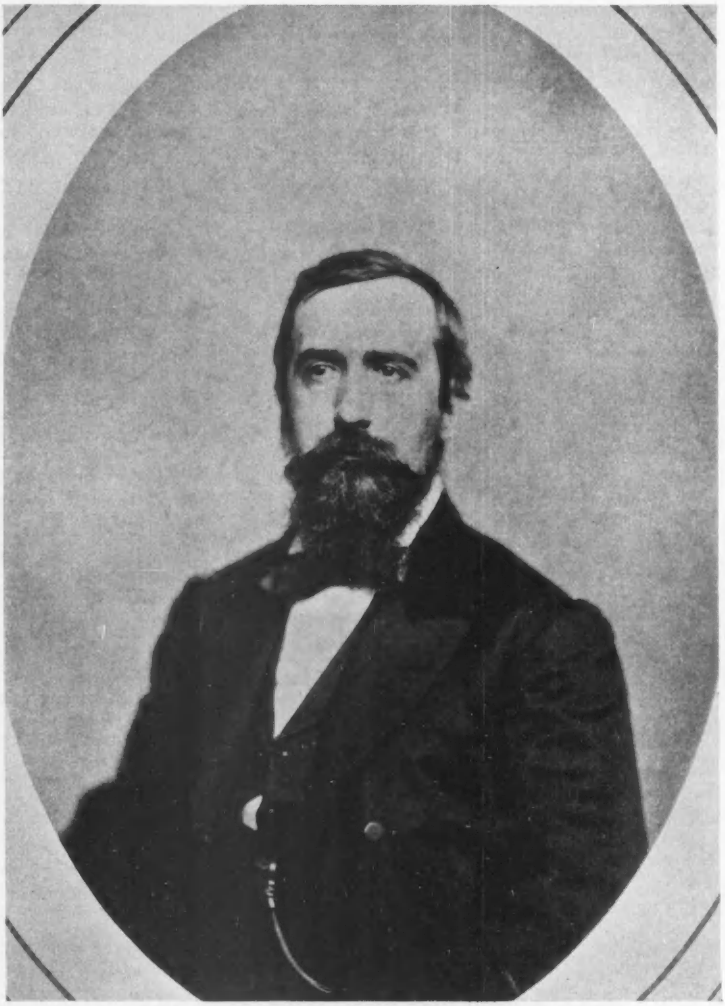

Fig. 36. John Xantus de Vesey; born 1825, died 1894. This portrait, from the files of the Smithsonian Institution, was taken about the time of the Civil War.

two years before from Mexico, 50 were to report at San Diego for the establishment of headquarters for the Mexican Boundary Survey, 71 remained in Los Angeles (then a pueblo of 500 inhabitants) to begin at the Ocean and work inland on township and section lines, while the balance proceeded with a large pack train to the Fort Tejon headquarters, there to establish the draughting and map construction bureau. Xantus states that he was chief of the sketching department of this bureau, with five draughtsmen under him, and it may be that he had charge of the topographical mapping. This is a far cry from the lowly duties of a hospital steward, which tradition has it was his work both in the middle-west and in California, and with which it is entirely impossible to reconcile his own clear statements. However, his official duties, whatever they were, never seemed to interfere in any way with the steady flow of collections forwarded by him to Washington.

The published letters end with his arrival at Fort Tejon in July, 1857, but his California narrative is carried forward in great detail in the "Utazas", published in Budapest in 1860. This book, titled "Travel in the Southern parts of California," has been translated under Professor Joseph Grinnell's direction by E. H. Yolland, and the manuscript, not yet published, is now in the Bancroft Library. While it is valuable chiefly from the standpoint of history and ethnology, it contains as well some natural history, though space cannot be spared here for an abstract of this matter. Suffice it to say that a close reading of the translation fails to reveal a single reference to the great Condor (*Gymnogyps californianus*) that must have been almost constantly in sight around Fort Tejon while Xantus was making his famous collection of birds there. In one of his Philadelphia Academy papers he does make a more or less indirect reference where he states in volume XI of the Proceedings, on page 189: "Many additional species of raptores and water birds were seen but could not be obtained, and though many of these were readily recognized, I have not felt at liberty to mention them in the list, which consists entirely of species actually collected within a few miles of the Post, and now in the Museum of the Smithsonian Institution."

During his residence of nearly two years at Fort Tejon, Xantus not only furnished a wealth of material on which important findings were based by many eastern systematists, some of whom did not overlook to commemorate his name in the nomenclature, but he described three new birds and at least one new plant himself from this point. The association of his name with the original descriptions of *Syrnium occidentale* Xantus [= *Strix occidentalis occidentalis* (Xantus)], *Tyrannula hammondii* De Vesey [= *Empidonax hammondii* (Xantus)], and *Vireo cassinii* De Vesey [= *Vireo solitarius cassinii* Xantus], published in the Proceedings of the Philadelphia Academy for 1858 and 1859, is well known, and his later gifts to science in the same publication of four new birds from Cape San Lucas are equally familiar to students. His botanical descriptions, however, do not seem to be so widely known. He records in the *Utazas* that in 1858 there was published in Philadelphia over his name a "Botanical Memoir of Southern California," and he makes a passing reference to *Salix cascarilla* Xantus. The present writer has been unable to trace this title, and nothing whatever other than this slight reference can be given in this place.

Having attracted favorable attention in Washington and elsewhere to his versatile scientific qualifications, Xantus was transferred from Fort Tejon early in 1859 and given a responsible assignment in Lower California with the United States Coast Survey. Professor Baird has given in an undated memorandum to the President of the Hungarian Academy of Science an admirable summation of

Xantus' relations with the Government during this and subsequent periods, which, though there are slight repetitions, is worth transcribing here in full. Professor Baird says:

Our relationship with Mr. Xantus commenced in 1855 when he was in the employ of the Medical Department of the United States at Fort Riley, a military post in the interior of Kansas. By this Department he was transferred in the spring of 1857 to Fort Tejon in California,... where he remained until the end of 1858. At this time the United States Coast Survey, desirous of establishing a tidal station at Cape St. Lucas, and of placing it in charge of a man of scientific training, was induced, through the efforts of this Institution, to offer the position to Mr. Xantus, who accepted it and proceeded to his post of duty early in 1859. Here he remained until the summer of 1861, in the meanwhile visiting and exploring the lower part of the peninsula of Lower California, the adjacent islands in the Gulf, Tres Marias Islands, Mazatlan, etc., when the tidal series being completed he sailed for San Francisco. In October of 1861 he visited Hungary, and coming back in 1862, was immediately assigned by the Surgeon General of the United States to a responsible position in his office. Recently, at the earnest solicitation of men of science in this city, he has been appointed United States Consul at Manzanillo, in western Mexico, to which place he will proceed in a few days.

During the period of time from 1855 to 1861, this Institution has been in constant, at least monthly correspondence with Mr. Xantus, receiving all the collections made by him... . A reference to the annual reports of this Institution since the date mentioned will show the estimation in which the results of his labors have been held. It will be sufficient to say here that his collections are believed to have been much larger and more complete than any ever made before in America during the same period of time by any one person. No department of Natural History appears to have been neglected by him, and the scientific journals of the United States bear constant reference (and will for some time to come) to materials gathered by him and entrusted by the Smithsonian Institution to various naturalists for elaboration. The total number of boxes of specimens received from him at the two points alone of Fort Tejon and Cape St. Lucas amounts to 120, and his catalogue of objects collected to about 10,000. When it is remembered that in general only birds and mammals were numbered separately, a bale of plants, a box of shells or insects, a jar of fishes, reptiles, crustaceans, etc., each bearing but a single number, the enormous aggregate of specimens gathered may readily be imagined.

To the above memorandum the late Dr. Chas. W. Richmond shortly before his death added the following note:

In the National Museum are eight field registers or catalogues of specimens covering Xantus' activities in Cape St. Lucas and general vicinity from April 20, 1859, to December, 1860, amounting in all to 6,033 entries. There are also four field registers relating to his collections made in western Mexico from January, 1863, to February, 1864, numbering about 3,000 entries. The registers from Fort Tejon, California, are missing.

In the National Museum Library is a bound volume of letters from Xantus, numbering at least 600 pages, dated from February 1, 1857 (Fort Riley, Kansas) to June 3, 1864 (New York).

The high value of Xantus' many years of gratuitous and constantly faithful service to vertebrate science, which even a mere recital of the above brief memoranda so graphically subscribes to, cannot be overestimated. His prolific pioneering enriched the opportunities of such broadly visioned technicians as Baird, Cassin, Lawrence, and a host of others, for a better organized understanding of the entire biota of regions then but little known. When it is remembered that his almost unparalleled activity in the field was only incidental to a more or less full routine of other interests, it is obvious that Professor Baird's succinct memorandum can be interpreted as little less than a veritable tribute to an esteemed and respected subordinate. Xantus

can of course never be entirely forgotten, but a republication in English of his own writings, of which the present paper is the briefest possible abstract, cannot fail to make better understood the real importance of his place in the early development of natural history in America.

The D. R. Dickey Memorial Library of Vertebrate Zoology, California Institute of Technology, March 21, 1934.

BIRD NOTES FROM SOUTHERN ARIZONA

By BERRY CAMPBELL

During the months of July and August, 1933, my wife and I made a general vertebrate collection in southern Arizona, mostly in the vicinity of Pena Blanca Spring, Santa Cruz County, but also in Miller Canyon, Huachuca Mountains, and near the town of Patagonia. Some specimens were taken as we traveled between these points, and a few were given to us by ranchers. The first of these localities is in the broken country to the west of the Santa Cruz Valley. It is about seven miles west of Nogales and three miles north of the international boundary, as the crow flies. The elevation is close to 4000 feet. Three canyons, two of which are rather small, empty into a large open wash. At this junction is situated Pena Blanca Spring. The water flow is small but constant and has been led into a tank, twenty by twenty by five feet, which serves as a reservoir for a cattle trough. There is a slight overflow the year around. Thus local animal life that needs it is insured a constant water-supply. A mile or so below the spring, the canyon again "boxes" up. On the United States War Department maps, the name of this spring and canyon is erroneously given as "Pino Blanco."

The Pena Blanca area is characterized chiefly as Upper Sonoran grassland. Only in the favorable localities such as in ravines and the larger canyons and on the north facing slope are brush and trees to be found. However, as the country is quite broken, these situations are common enough to make a fair stand of live oak, walnut, and sycamore possible. The latter species is particularly abundant in the neighboring Walker Canyon. The rainy season in this region lasts from early July to late September. At this time the grass grows knee deep where grazing is not too heavy.

Though at first glance the district looks to be Upper Sonoran, the following list of the more indicative birds seen or collected before July 15 shows some interesting paradoxes:

Cyrtonyx montezumae mearnsi Nelson
Columba fasciata fasciata Say
Coccyzus americanus occidentalis Ridgway
Tyto alba pratincola (Bonaparte)
Otus asio cineraceus (Ridgway)
Otus trichopsis (Wagler)
Micropallas whitneyi whitneyi (Cooper)
Cynanthus latirostris Swainson
Dryobates scalaris cactophilus Oberholser
Antrostomus vociferus arizonae Brewster
Phalaenoptilus nuttallii nuttallii (Audubon)
Tyrannus vociferans Swainson
Myiarchus tyrannulus magister Ridgway
Myiarchus cinerascens cinerascens (Lawrence)
Myiarchus tuberculifer olivascens Ridgway
Myiochanes richardsonii richardsonii (Swainson)
Pyrocephalus rubinus mexicanus Sclater
Tachycineta thalassina lepida Mearns
Sitta carolinensis nelsoni Mearns
Phainopepla nitens lepida Van Tyne
Dendroica nigrescens (Townsend)
Setophaga picta picta Swainson
Tangavius aeneus aeneus (Wagler)
Icterus parisorum Bonaparte

Guiraca caerulea interfusa Dwight and Griscom
Piranga flava hepatica Swainson
Piranga rubra cooperi Ridgway
Sialia sialis fulva Brewster

Many of these we found breeding, and there is every reason to believe that all of them breed in the vicinity.

One explanation may be offered for this apparently queer occurrence of the Elf Owl. It has been generally held that to look for these birds out of the sahuaro cactus belt was a waste of time (see Swarth, Proc. Calif. Acad. Sci., ser. 4, 18, 1929, p. 296). The thesis I wish to advance is that the Elf Owl has been imperfectly understood, and that it is not limited to the giant cactus belt, but is equally at home in the foothill country. The nearest grove of sahuaros seems to be that near Continental, thirty miles away, and this stand is composed of ten or twelve plants in all (Swarth, *op. cit.*). Yet apparently these little owls actually outnumber the Screech Owls at Pena Blanca. A downy young, being fed by the parent bird, was collected July 18, 1933. Surely we must revise our ideas concerning the habits of the bird. The presence of *Tangavius aeneus aeneus, Myiarchus tyrannulus magister, M. cinerascens cinerascens,* and *Dryobates scalaris cactophilus* may perhaps also be explained in the same manner. An annotated list of the less common species collected follows.

Cyrtonyx montezumae mearnsi. These Quail are abundant at Pena Blanca, probably because of the closed season. The ranchers in the region, who are rather sharp observers, maintain that the birds nest in the rainy season, in other words, in July and August. This I was unable to verify, though I believe it to be true. This is the only time they would have adequate cover for the young. When we first arrived, in late June, all of the quail that we saw were in pairs. I watched several pairs early in the rainy season and am convinced that there were no juveniles. I was, however, unable to observe them enough later in the season to check up on the point.

Tyto alba pratincola. Specimen collected at Pena Blanca Spring: no. 2092, July 8, 1933. These birds, which have been considered rare in southern Arizona (Swarth, Pac. Coast Avif., no. 10, 1914), are in reality quite common—in the area near Pena Blanca at least. Two carcasses were found in a cave near the spring. Specimen number 2092 was collected out of an old mine shaft. In Walker Canyon I heard one fly over and call, August 2, 1933. I am told that they nest commonly a mile or so down Walker Canyon, where it "boxes" up.

Otus asio cineraceus. Specimens collected at Pena Blanca Spring: nos. 2002-04, June 29, 1933; 2063, July 5, 1933; 2156, July 17, 1933. Patagonia: no. 2391, August 24. 1933. These birds were the most abundant Screech Owls in the Pena Blanca area and were heard commonly at night. Stomach contents were as follows: 2002-03, Hemiptera, spiders, vinagerones, and scorpions; 2004, 8-inch *Diadophis,* grasshopper; 2063, two vinagerones and a large beetle; 2391, cicadas.

Otus trichopsis. Specimens collected at Pena Blanca Spring: nos. 189, September 2, 1931; 190, September 1, 1931; 2007, June 30, 1933; 2255, August 2, 1933. Walker Canyon: nos. 2269, August 2, 1933; 2270, August 3, 1933. Finding these owls at Pena Blanca extended the range westward from the Huachucas. They are quite abundant and may be heard calling with the regular Screech Owls. They seem to make all of the calls of *cineraceus* and have a distinctive note besides. This note is a one-pitched whistle in a drum-roll rhythm, – – –′ – – – – –′ — — – – –′ – –. We found a family of young ones, apparently just out of the nest, in Walker Canyon. They were tame and could be approached easily with a flashlight. When a light was shined on them, they seldom would look at it and consequently it was difficult to get a reflection from their eyes. It was possible, by making a mouselike squeak, to attract the owl's

attention and so get the reflection. Stomach contents were as follows: nos. 190, mantis and grasshopper; 189, mantis, grasshopper, and centipede; 2269, 2 *Stenopelmatus*, 2 caterpillars, and one very large beetle; 2007, 2 large hairy caterpillars and one vinagerone; 2269, beetle remains, finely broken. The presence of *Stenopelmatus*, or mole cricket, indicates that these owls must feed from the ground, in part at least. I have observed them on the ground only once.

Bubo virginianus pallescens. Specimen collected at Pena Blanca Spring: no. 2211, July 22, 1933. Swarth (1929) mentions that two specimens collected near Patagonia were very dark and resembled the subspecies *pacificus*. My specimen agrees with this. I compared it with a large series of Horned Owls in the Dickey collection at the California Institute of Technology and was unable to distinguish it from the *pacificus* specimens from the coast, but could do so from any of the *pallescens*.

Micropallas whitneyi whitneyi. Specimens collected at Pena Blanca Spring: nos. 2005, June 30, 1933; 2061-62, July 4, 1933; 2078, July 7, 1933. Walker Canyon: no. 2164, July 18, 1933. In the minds of most ornithologists, there is no use in looking for these owls outside of the sahuaro cactus belt. This error had probably delayed their discovery elsewhere. Surely it is a mistake to believe that they are limited, for, as mentioned above, they are the most abundant of the owls in the Pena Blanca area. That they nest here there can be no doubt, for number 2164 is a juvenile still in down. As I was stalking it, the parent bird came up and fed it. Stomach contents were as follows: no. 2005, five large bot fly pupae and one Hemiptera; 2078, vinagerone.

Strix occidentalis lucida. Specimen collected at Miller Canyon: no. 2335, August 18, 1933. Some notes on the calling of this owl were taken which seem worth recording here. I had learned the Spotted Owl call from Dr. L. H. Miller, and in the Huachucas was surprised to find that I was several notes higher in pitch than the owls which I first heard near the summit of the mountains. Later I heard one that called the same note which I had learned. Several days later, two came to my call and by the fact that there was such a considerable interval between their pitches, I predicted that they were of different sex and that the lower was the male. I collected the latter and found that the second guess was correct, but was unable to verify the other. Analogy with Horned Owls would lead one to believe it to be so. It is seldom, I believe, that Spotted Owls become active before the last light of dusk has disappeared, but I was able, by imitating their call, to rouse some in the early twilight, not more than fifteen minutes after sundown. Before it was too dark to shoot without the aid of a flashlight, a pair, mentioned above, flew a third of a mile across a canyon to a station thirty feet from the place where I was decoying them and showed every sign of great excitement.

Antrostomus vociferus arizonae. In the Pena Blanca region, Whip-poor-wills were abundant in 1931, when we were there in June. Dr. L. H. Miller collected several. In 1933, however, none was heard, though we listened carefully for them during our six weeks stay.

Basilinna leucotis. Specimen collected at Miller Canyon: no. 2291, August 11, 1933. An adult male of this species was shot as it flew in and out of a dense fir tree. It was noticed that when the bird faced the observer, both of the white marks on the sides of the head showed plainly.

Passerina ciris. Specimen collected at Pena Blanca Spring: no. 2237, July 27, 1933. An adult male, though in the regular female plumage, was collected in a large live oak tree several hundred yards from the spring.

Johns Hopkins Medical School, Baltimore, Maryland, January 23, 1934.

THE VOCAL APPARATUS OF SOME NORTH AMERICAN OWLS

WITH ONE ILLUSTRATION

By ALDEN H. MILLER

Studies of the anatomy and function of the vocal apparatus of owls have not thus far dealt with many of the North American species. Most of our knowledge of strigine syringes is based on Beddard's dissections (1888 and 1898) of scattered representatives of the group, chiefly from the Old World. In examining syringes of eight species of owls from the western United States I have encountered, firstly, some sex differences which are correlated with differences in the utterances of the birds, and, secondly, some facts decidedly at variance with Beddard's descriptions and illustrations. These matters and the functioning of the apparatus appear to merit clarification. I am indebted to Miss Frances Carter, Mr. Lawrence V. Compton, Dr. Loye Miller, Dr. S. B. Benson, and Mr. W. H. Behle for aid in securing materials.

The syringeal enlargement of the air passages of owls occurs chiefly in the bronchi where the latter join with the trachea. The enlargement is effected by increased diameter of the cartilaginous, sometimes partly osseous, rings. At the point of enlargement the rings are much more rigidly bound together than posteriorly along the course of the bronchi. In this way they form on each bronchus a fairly rigid sound chamber well set off from the remainder of the bronchus. The rigidity of structure extends forward through the first few rings of the trachea, but little enlargement is to be noted here in comparison with the remainder of the trachea.

The bronchial rings of the syrinx are incomplete dorsomedially, their free ends joining with those of adjacent rings to form well defined margins. Across the space between these margins is stretched a thin membrane like the head of a drum (internal membrana tympaniformis). The membrane is bounded anteriorly by the fusion of cartilages at the junction of the bronchi. Posteriorly it is continuous with a lesser, narrower membrane extending on down the bronchus. The cartilaginous bar that runs dorsoventrally and marks the beginning of the division of the single tracheal passageway into the bronchial chambers is the pessulus. No discernible vibratile semilunar membrane extends anteriorly from the pessulus, the pessulus merely bearing a sharp anteriorly projecting edge. I have been unable to find any internal muscle fibers in this immediate region.

Owls are uniform in the possession of a single pair of intrinsic muscles that run on either side of the vocal apparatus from the lower trachea to the bronchial ring just posterior to the solid block of bronchial rings comprising the main syringeal sound chamber. The principal point of variation among members of the group is the length of the bronchial enlargement. Another way of expressing this variation is in terms of the number of the ring to which the intrinsic muscle attaches.

In this connection should be mentioned a confusion in the terminology of the rings owing to various views regarding the termination of the trachea. The viewpoint I prefer is to consider the most posterior ring with which the pessulus merges as the last tracheal ring. (The pessulus may merge on the dorsal side only with the penultimate tracheal.) This usage presupposes, in making comparisons, that the location of the pessulus is constant and homologous throughout the group. The other viewpoint is to regard the muscle insertion as a constant point of reference and term the ring involved in the insertion the first bronchial ring. The varying number of rings anterior to it are then termed incomplete or divided tracheal rings—a rather ambiguous designation. By this latter method it is implied that the trachea has split into two tubes

which one might call false bronchi. I am aware of no good evidence in owls for considering the region just posterior to the bifurcation in this light. Perhaps neither the muscle attachment nor the pessulus are homologous in their loci throughout the owls. But, in view of observed differences in the two sides of a single individual as to point of muscle insertion, I regard this as the least stable and hence least useful point of reference.

The muscle attachment criterion seems to be used justifiably by Forbes (1882) in his treatment of the Tubinares. Beddard in his earlier paper on owls (1888) used the muscle insertion as point of reference, but abandoned it for the other criterion in his Structure of Birds (1898). This change I believe to have been responsible for an erroneous statement in the latter paper. Beddard reports that the point of muscle insertion (length of bronchial syrinx) varies from bronchial ring number one in *Tyto alba* (*Strix flammea* of Beddard) to number ten in *Asio* (*Scops* of Beddard) *leucotis*, an African species. My own dissection of *Tyto alba pratincola* showed the rings much fused and the insertion apparently on the third bronchial ring, possibly on the second, but certainly not the first (numbered from the pessulus); Beddard's finding is clearly indicated in a drawing supplementing his description. His statement (1898, p. 252) that the insertion is on the first bronchial in *Bubo* and *Syrnium* (*Strix*) is not borne out by his drawing of *Bubo maculosus* which shows it at least as far distal as the third ring. This discrepancy which I have indicated seems due to faulty transcribing from one system of ring numbering to the other. My examinations of a number of syringes of *Bubo virginianus* and of *Strix occidentalis* reveal insertions on the fourth to sixth rings. *Asio wilsonianus* (*Asio otus wilsonianus* of Hartert) has insertions on the sixth, seventh and eighth rings; Beddard reports insertion on the seventh in *Asio otus*. His drawing of *Asio leucotis* indicates the eighth or ninth ring rather than the tenth as reported.

The extreme of development as regards numbers of rings in the sound chambers which I have found has been in *Otus asio* and *Cryptoglaux acadica* where the insertion is on the eighth bronchial. In *Asio wilsonianus* the bronchial rings were not complete as Beddard found to be the case in *Asio leucotis* and the European *Asio otus*, a significant difference in Old World and North American Long-eared Owls. Both Beddard and Wunderlich (1886) did not find complete bronchial rings in *Asio flammeus* (formerly *A. brachyotus*).

Tabular presentation of the insertions and of the width across the entire apparatus from the insertion on one side to that on the other follows. The latter indicates the general proportions of the apparatus so that comparison with body weights of these and other owls may be made.

Number	Name	Sex	Muscle insertion Right	Muscle insertion Left	Width in mm. across points of insertion	Weight in grams
62757 M.V.Z.	Tyto alba pratincola	♀	3	3	7.0	530.0
1373 L.V.C.	Tyto alba pratincola	♂	3	3	6.3	.....
1269 A.H.M.	Strix occidentalis caurina	♀	5	4	8.4	.....
1729 A.H.M.	Strix occidentalis occidentalis	♂	6	5	10.5	528.1
1271 A.H.M.	Strix occidentalis caurina	♂	6	5	11.8	.....
31270 M.V.Z.	Strix occidentalis caurina	♂	..	..	..	610.0
25887 M.V.Z.	Strix occidentalis occidentalis	♀	..	..	..	693.0
62738 M.V.Z.	Bubo virginianus pacificus	♀	5	5	15.0	1544.3
61345 M.V.Z.	Bubo virginianus occidentalis	♀	5	5	15.2	.....
63665 M.V.Z.	Bubo virginianus saturatus	♂	5	5	17.3	.....
62653 M.V.Z.	Bubo virginianus pallescens	♂	5	5	17.8	.....
62739 M.V.Z.	Bubo virginianus pacificus	♂	5	5	18.0	1010.0
64071 M.V.Z.	Bubo virginianus pallescens	♂	5	5	19.2	.....

62758	M.V.Z.	Bubo virginianus pacificus	♂	5	5	19.5	1083.0
27881	M.V.Z.	Speotyto cunicularia hypugaea	♂	..	..	..	143.7
1227	L.V.C.	Speotyto cunicularia hypugaea	♂	6	6	7.0	.....
1708	A.H.M.	Glaucidium gnoma californicum	♂	6	5	5.7	61.1
1532	A.H.M.	Glaucidium gnoma pinicola	♂	5	6	6.3	61.0
1649	A.H.M.	Glaucidium gnoma californicum	♂	6	6	6.2	.....
1732	A.H.M.	Asio wilsonianus	♀	7	6	8.1	209.7
64073	M.V.Z.	Asio wilsonianus	♂	7	8	9.0	196.3
63664	M.V.Z.	Cryptoglaux acadica acadica	....	8	..	6.6	.....
1229	L.V.C.	Otus asio asio	♀	8	8	6.8	.....
62618	M.V.Z	Otus asio gilmani	♂	8	7	7.7	.....
1684	A.H.M.	Otus asio gilmani	♂	8	8	7.5	.....
51738	M.V.Z.	Otus asio quercinus	♀	..	..	..	163.2
53765	M.V.Z.	Otus asio quercinus	♀	..	..	..	164.0
51737	M.V.Z.	Otus asio quercinus	♂	..	..	..	131.5
31050	M.V.Z.	Otus asio quercinus	♂	..	..	..	108.0

The asymmetry in the number of rings in the bronchial syringes of *Strix occidentalis, Asio wilsonianus, Glaucidium gnoma* and *Otus asio*, considering the small number of specimens of each examined, points to high frequency of occurrence of this asymmetry; whereas the perfect symmetry in seven specimens of *Bubo virginianus* suggests lack of asymmetry in this latter form. When the two bronchial sound chambers are unequal, the right side is not always greater than the left, the reverse being true in one of the Pigmy and one of the Long-eared owls. Asymmetry is always brought about by the addition or subtraction of rings from the rigid block of rings constituting the sound chamber, not by the insertion of an extra loose ring just anterior to the muscle attachment. Actually the difference in number of rings overemphasizes the asymmetry, since an extra ring is partially compensated for by lesser width of rings on the side on which it occurs.

Such variation in component elements of right and left sound chambers and the variation among individuals shown in the table make it clear that the point of muscle insertion, which varies in accordance with the sound chamber, is not sufficiently stable to be used as a starting point for numbering the rings of the air passageways. Should one follow the muscle insertion criterion and consider this point the end of the trachea, it is impossible to explain the rings of asymmetrical sound chambers as divided tracheals; unequal numbers of rings on the two sides could hardly be produced by a median division of each tracheal.

The asymmetry of the syrinx, so far as I am aware, has not been detected in owls heretofore, although various types of asymmetry are well known in other orders of birds. The condition is of especial interest in this group, because of the well known occurrence of ear, and concommitant skull, asymmetry in the Strigidae. Of the four types in which I have found asymmetrical syringes, *Glaucidium* and *Otus* are without asymmetry of the ear; *Strix* and *Asio* have asymmetrical ears. *Bubo*, according to Shufeldt (1900) in his translation of Collett, is asymmetrical in the ear region, while Coues (1903) considers it symmetrical. The asymmetries of syrinx and auditory apparatus are, then, not necessarily associated, yet the tendency to asymmetry within the family is more strongly established by these data on the syrinx. Possibly there is some significance in the fact that Collett found the right ear more often the larger of the two, just as I have found the right bronchus more frequently to possess the greater number of rings. There are six of the eight asymmetrical syringes in which the right side has the greater number of rings. Is there possibly a deep-seated predilection to morphological dominance of the right side?

The differences in the syringes of the species I have dissected do not indicate, I believe, any special relationships between these forms and do not place them in a sequence that is in agreement with the relationships indicated by other characteristics

of the species. *Asio wilsonianus* differs from others by reason of a broadly flattened anterior margin of each sound chamber. Wunderlich (1886) apparently found the same condition in *Asio flammeus*. Even the Barn Owl, for other reasons known to be well set off from the Strigidae, as regards syrinx represents little more than one extreme of the more or less continuous structural series; it is not widely separated from *Strix* in the number of rings, although the rings are more completely fused, and the two short sound chambers are bound together medially by a ligament. Beddard likewise was unable to attach much phylogenetic significance to owl syringes.

Among birds generally, sex differences in the syrinx are not uncommon. Such differences are pronounced in ducks and have been reported in several gallinaceous forms and in song birds. Appel (1929) recently has found, however, that in the brown leghorn structural differences are lacking. According to Häcker (1900) song birds display a sex dimorphism manifested as weaker muscles and less specialized cartilages in the female. When females have been heard singing in a manner comparable to males, it is often reported that their songs differ from those of the males in volume, not in pitch or complexity. The similarity is not so perfect, however, in many oscine species, as for example in *Icterus* where differences in song pattern and quality have been detected (Miller, 1931, and Youngworth, 1933).

In 1930 Loye Miller described sex differences in Horned Owl notes, a condition familiar to several persons who have listened to and collected Horned Owls but apparently not recorded in print by many writers. My own observations of Horned Owls have determined an average difference of three, sometimes four, half tones of pitch, the males being the lower. Comparable intervals probably distinguish male and female Screech Owls. An individual Horned Owl has been known to alter the pitch of its hoot, within a few minute's time, a matter of two half tones. Nevertheless, the average difference between the sexes is so marked that in the field one may with practice fairly satisfactorily identify them by this means.

I have no data on sex differences in the voices of Burrowing, Pigmy, Long-eared and Barn owls, but with regard to the Spotted Owl I offer the following experience. On May 26, 1932, fourteen miles west of Willits, Mendocino County, California, I called into camp a pair of Spotted Owls. One bird hooted consistently five to six half tones higher than the other. In the assortment of barks, whistles, and cat-calls in which this species is proficient, I could not distinguish comparable differences, but the hoots were always differentiated. The male was collected just after it was watched in the beam of a flashlight giving the low-pitched hoot. The other bird of this pair (without doubt a female in view of the season and joint occupancy of a territory with the male) was not secured; but another female was taken on the same expedition on the Eel River, ten miles north of Garberville, Humboldt County.

Turning attention again to the Horned Owls where the sex difference is best known, it may be seen from the measurements in the table that the females possess smaller syringes, this despite the fact that females are much larger birds than males. Available figures show that females weigh about 50 percent more than males. Contrarily, the syringes (using the aforementioned measurements as an index) of females average 17 per cent smaller than those of males. The single female Screech Owl syrinx is 10 per cent smaller than those of males; body size of females is about 33 per cent greater. The female Long-eared Owl has a syrinx 10 per cent smaller and weighs 7 per cent more than the male.

The sexes in *Strix occidentalis* are not as greatly differentiated in body size and wing length (see Oberholser, 1915, p. 255) as in *Bubo* and *Otus*, though the female is here also the larger. It perhaps follows, then, that the one available female syrinx

is relatively extremely small, being 24 per cent less than the average of the two males (see fig. 37). Not only is it small but it also possesses fewer bronchial rings as is the case in the female *Asio*.

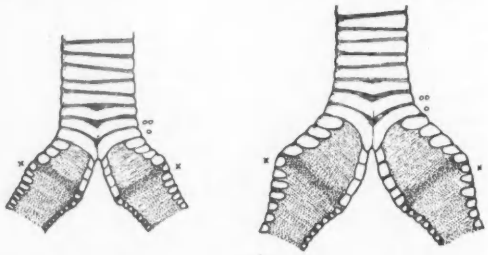

Fig. 37. Dorsal view of syringes of *Strix occidentalis*, × 2½; left, female, no. 1269 A.H.M.; right, male, no. 1271 A.H.M. Letter x marks ring on which intrinsic muscle inserts; o = last tracheal ring; oo = penultimate ring. Thickened portion of internal membrana tympaniformis is represented extending across between ends of cartilages at point of muscle insertion. Note sexual dimorphism in size and number of rings, and asymmetry of bronchial sound boxes.

Tyto alba differs markedly from the foregoing inasmuch as the female syrinx is 11 per cent greater than the male.

It may be concluded that syringeal size in certain, and perhaps all, of the Strigidae is a well-marked secondary sexual character that reverses a trend in general bodily development which would, *a priori*, lead one to anticipate a larger voice box in females as appears to be the case in the Barn Owls (Tytonidae). The structures are not only different quantitatively but are responsible for average differences in pitch of hoots. The smaller syringes are obviously productive of the higher tones. It does not seem likely that nervous control would account for all difference in pitch; rhythm is more liable to differential nervous control in the sexes. The situation may be compared to the sexual differentiation of the human larynx and voice but not carried to so great a degree.

To attempt to locate more exactly the parts responsible for the pitch of an owl's hoot, I attached the two bronchi of a freshly killed Horned Owl's syrinx to glass tubes carrying compressed air. The only manner in which a sound could be induced was by spreading the bronchi so that the bronchial tubes were constricted at the posterior end of each voice box and the air thrown against the dorsomedial membranes of the boxes. Gratifyingly, the sound produced was similar to a Horned Owl hoot in pitch and in many points of quality, although it lacked greatly in resonance and volume. It was sufficiently similar that I am convinced the vibration of the membrane which I could clearly see was intimately connected in some way with the initial vibration and fundamental tone of the normal hoot. The complicated screeches and whistles of Spotted, Screech and Long-eared owls might be initiated in the syrinx in a different manner. In the experiment the entire trachea was intact. When finally the trachea was broken shortly in front of the syrinx much of the quality of the note was lost owing, I presume, to loss of resonance for the overtones as well as for the fundamental, but the pitch of the fundamental remained unchanged.

These observations prompted further inspection of the membranes of the bronchial sound boxes. The internal membrane opposite the ring on which the muscle inserts was found to be slightly thickened and the parts of the membrane next the free ends of this incomplete ring bore a layer of muscle internally. Also at this point on the other side of the tube just behind the ring bearing the insertion and between it and the next ring posterior there is a considerable extent of loose membrane (external membrana tympaniformis) which unless the intrinsic muscle be contracted projects as a fold or pocket into the cavity of the passageway. When the extrinsic muscles contract the whole syrinx is thrust back toward the sternum. This throws the bronchi more nearly at right angles to the trachea and bends the bronchi at the ends of the sound chambers. The angle at this point causes the fold of the external membrane to project far into the cavity almost or entirely in contact with the opposite, internal, membrane. In this position air can vibrate the membranes, particularly the internal membrane as witnessed in the experiment. The muscles on the membranes should be able to regulate tension. Tension may also be modified by the changes in the position of cartilages induced by intrinsic and extrinsic muscles. Contraction of the intrinsic muscle withdraws the fold of the external membrane from the passageway so regulating the aperture. It may be that vibration is set up in the external membrane which bears some resemblance to the mammalian vocal cord as well as in the opposite membrane.

The frequently encountered statement regarding function of the avian syrinx ascribes the sound to vibrations of the semilunar membrane on the pessulus. This is true of singing birds, but in many others the vibrations are set up in loose membranes between bronchial or tracheal rings or by a membrane such as I have described in owls. In chickens tympanic membranes on the lateral and medial surfaces of the syrinx between widely separated rings vibrate to produce the tone (Myers, 1917). I have traced sound in a turkey syrinx to a similar source by using compressed air as was done with the Horned Owl. No functional semilunar membrane is present in these Galliformes.

At the time these investigations were conducted I was not aware of the recent paper by Rüppell (1933) which treats in admirable fashion of the physiology and acoustics of the syrinx. My findings accord with his, namely, that the tone is produced by vibrating elastic membranes of the syrinx setting up vibrations in the column of air passing through the trachea. The mechanism is to be compared with an organ pipe (reed type). It is not perhaps certain, however, to what degree the period of vibration of the membranes is influenced by the length of the trachea acting as a resonator. Working experimentally with hens and with a crane syrinx Rüppell found, as did Myers (1917), that shortening the trachea raised the pitch, presumably because the resonator (trachea) is gaged then to a shorter wave length and the membrane coerced to vibrate in accordance with that length. Rüppell's results leave little doubt on this point on the species investigated. In owls I am inclined to believe the membrane acts as a driver, to use Negus' description (1929), and sets up a given vibration rate whether the tracheal tube resonates the fundamental or not. In such case the membrane sets its own pace and is not altered by length of its pipe. I have been brought to this viewpoint regarding owls because the pitch was not altered when the trachea was shortened and because female owls, although possessing tracheae equal to or longer than those of males, produce sounds of higher pitch.

Even where tracheal length influences the pitch it is not certain that the individual bird varies the length to alter the pitch; rather is this done, in part at least, by varying tension in the membranes. Reference to figure 37 will show that the bron-

chial voice boxes of owls are widest at the posterior end exactly where the vibratile membranes are situated. The width taken here across the ends of the cartilage rings will be essentially the length of the vibrating membranes. Length of membrane is important, for, if tension is constant, length of membrane is inversely proportional to vibration rate or pitch, presuming that tracheal length does not dictate vibration rate of membrane. A thin rubber band of length equivalent to the elastic membrane of a Horned Owl syrinx when placed at low tension can be blown upon to emit a tone near that of the pitch of the bird's hoot. Lengths of membranes in millimeters, with diameters of bronchi behind syrinx and tracheae in front of syrinx as standards of comparison, follow:

Number	Species	Sex	Length of vibrating membrane	Per cent of bronchial diameter	Bronchial diameter	Tracheal diameter
62757 M.V.Z.	Tyto alba	♀	7.0	166	4.2	5.8
1373 L.V.C.	Tyto alba	♂	6.7	167	4.0	5.8
1269 A.H.M.	Strix occidentalis	♀	7.1	191	3.7	4.6
1271 A.H.M.	Strix occidentalis	♂	8.4	227	3.7	5.6
1729 A.H.M.	Strix occidentalis	♂	8.8	209	4.2	5.9
61345 M.V.Z.	Bubo virginianus	♀	11.1	209	5.3	7.7
62738 M.V.Z.	Bubo virginianus	♀	12.0	203	5.9	8.6
62653 M.V.Z.	Bubo virginianus	♂	12.3	223	5.5	7.6
62739 M.V.Z.	Bubo virginianus	♂	12.4	238	5.2	8.6
64071 M.V.Z.	Bubo virginianus	♂	12.9	.....	....	8.3
63665 M.V.Z.	Bubo virginianus	♂	13.3	221	6.0	8.7
62758 M.V.Z.	Bubo virginianus	♂	13.7	228	6.0	9.0
1227 L.V.C.	Speotyto cunicularia	♂	5.7	203	2.8	4.4
1708 A.H.M.	Glaucidium gnoma	♂	3.6	.....	....	2.5
1532 A.H.M.	Glaucidium gnoma	♂	3.8	211	1.8	2.7
1649 A.H.M.	Glaucidium gnoma	♂	3.9	205	1.9	3.0
1732 A.H.M.	Asio wilsonianus	♀	6.4	200	3.2	4.6
64073 M.V.Z.	Asio wilsonianus	♂	7.3	214	3.4	4.5
63664 M.V.Z.	Cryptoglaux acadica	....	4.0	.....	....	3.3
1229 L.V.C.	Otus asio	♀	4.2	190	2.2	3.9
1364 A.H.M.	Otus asio	♂	4.7	204	2.3	3.8
62618 M.V.Z.	Otus asio	♂	5.0	.....	....	3.9

My own observations indicate that the pitches of male owls' hoots in certain species average as follows: *Bubo virginianus,* D (immediately above middle C); *Strix occidentalis,* C^1 (an octave above middle C); *Otus asio gilmani,* F^1; and *Glaucidium gnoma,* $A\#^1$. The reader should be reminded that the lesser resonance and volume in the smaller owls gives to an uncritical ear the impression of greater differences in pitch than actually exist. The hoot of *Strix occidentalis* commences on C^1, but the terminal note slurs down to about F#.

If 12.9 mm. be taken as the length of the membrane in male Horned Owls and D the tone produced (287.4 vibrations per second in the tempered scale) we can calculate what the hoots of males of the other species should be if the tone is a simple membrane vibration with tension and elasticity constant. Proceeding with the calculation, the vibration rate for *Strix occidentalis* is 442 or near A about half way between the observed top note and terminal slur. The figure for the Screech Owl is 764 or about G^2, one full tone higher than observed average. That of *Glaucidium gnoma* is 950 or between $A\#^2$ and B^2, a little less than a half tone higher than observations. In the matter of sex differences, the female Horned Owls should hoot near 321 or E which is a full tone higher than males, the observed difference being usually three half tones. In the Spotted Owl the female figures C# or four half tones higher than the male with the observed interval five to six half tones.

The parallelism of membrane length and observed tones, despite imperfections, is apparent. When a number of variables and errors come into the picture, such as

nervous control, error in measurement, varying tension and elasticity of membranes and resonating facilities, it is almost surprising that membrane length and pitch of hoot are so closely correlated. Seemingly different species of bubonid owls hoot in much the same fashion, so that membrane length is an index to the mean pitch value of the fundamental of the hoot.

Having established the significance of the membrane length, this dimension which represents the diameter of the greatest enlargement of the bronchus should be compared with the diameter farther posterior where the undifferentiated tube functions simply for the passage of air. The table gives the diameter at the membrane in per cent of undifferentiated bronchial diameter. The striking fact to be gained from these figures is that in both small and large species of owls the syrinx has been enlarged relative to the bronchus to about the same degree. *Bubo* has a slightly greater enlargement in both sexes, but the difference compared to other species is not striking. Irrespective of species in the Strigidae, female syringes are enlarged to about 160 to 200 per cent, males 200 to 240 per cent. Diameters of tracheae and bronchi of males and females are approximately equal and do not reflect in the data available the greater body bulk of the females. But, the enlargement to provide for the vocal membranes obviously is not equivalent in the sexes. In *Tyto* the enlargement is equivalent in the sexes and equal in degree to females in the Strigidae.

Within one sex, then, with the bronchial enlargement roughly equal in all species, the actual membrane length will vary in proportion to the diameter of the bronchus. Why is it that a Horned Owl has a bronchial diameter and vibratile membrane only three times as great as a Pygmy Owl when its total bulk (weight) is sixteen to twenty times as great? The reason is apparent when it is recalled that the area of the bronchial cross-section rather than the diameter stands in direct relationship to the bulk. The area of cross-section is directly proportional to the air carrying capacity of the bronchi, neglecting friction.

Average areas of cross-section follow: *Tyto alba,* 13.2 sq. mm.; *Strix occidentalis,* 11.7; *Bubo virginianus,* 24.6; *Asio wilsonianus,* 8.0; *Speotyto cunicularia,* 6.1; *Glaucidium gnoma,* 2.6; and *Otus asio,* 4.0. From these it is seen that functionally the bronchi of *Bubo* instead of being three times larger are nearly ten times greater than *Glaucidium.* The areas of bronchial sections approximate *roughly* the bulk of the body. *Bubo virginianus* is about twice as heavy as *Strix occidentalis* and has twice the bronchial section. The smaller owls do have greater bronchial sections relative to weight; this possibly is owing to the greater friction on the walls in these smaller tubes.

In conclusion, the size of the air passages corresponds in general to body size. Increase in body size increases proportionately bronchial cross-section. Diameter of bronchi increases, however, only as twice the square root of the cross-sectional area divided by Pi. Since the vibratile membrane is proportional to bronchial diameter, being in effect equal to the diameter of the enlarged tube, pitch of hoot relative to the size of the owl is much higher in the larger species. In other words, sizes of syringes and the ranges in pitch which they are capable of producing are largely determined by the size of the bird modified by the ratio of diameter of bronchial pipe to area of cross-section, except as altered by sexual differentiation in degree of bronchial enlargement.

SUMMARY

Syringes of eight species of North American owls have been dissected and compared with Beddard's descriptions of Old World species. Structural differences among species appear to have little or no phylogenetic significance, except in the case of *Tyto*

wherein lack of sex dimorphism, ligamentous connection of bronchi and fusion of cartilaginous parts set it apart from other owls.

An asymmetry has been found in the vocal apparatus which is present in certain species but not necessarily in those with ear asymmetry.

Structural differences have not been found that account for different types (qualities) of calls in different species. These must be ascribed to nervous control and to other factors influencing the overtones. However, correlation of mean pitch of the principal note (hoot) of several species and size of vocal apparatus has been established.

Sexual dimorphism in the syringes of the Strigidae reverses the trend of differentiation in the remainder of the body so that females possess smaller syringes than males (at least in *Bubo*, *Otus*, *Asio* and *Strix*). Correspondingly, female hoots are higher. Observed pitches of hoots of several species are recorded.

Experimentation has shown that the sound (hoot) is produced in owls not by a semilunar membrane but by membranes in each bronchus at the posterior end of the sound chambers. Muscular control of the membranes and adjacent parts is described. The tone production mechanism is to be compared to a reed organ pipe in accordance with Rüppell's (1933) views, except that variations in tracheal length seem not to alter pitch. Lengths of vibrating membranes are, in essence, inversely proportional to observed pitches of hoots.

The enlargement of the syrinx proportional to the remainder of the bronchus is closely similar in all species of owls. The higher pitched voices relative to body size in the larger forms seem to be explicable in terms of simple geometric principles governing the ratio of diameter to area of cross-section of the bronchial tubes.

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THE CLASSIFICATION OF SOME AMERICAN PIGEONS

By JAMES L. PETERS

In part 7 of the Birds of North and Middle America, Ridgway gives a key to the American genera of Columbae (pp. 279-283). In page 281 appears the following:

d. Wings more or less spotted with black, the distal coverts not white.
  e. Rectrices 14; the tail more than three-fifths as long as wing; tarsus less than one-sixth as long as wing; bill not decurved; smaller wing-coverts immaculate; a black subauricular spot, but no pale auricular stripe.
    f. Tail longer and more graduated (nearly three-fourths as long as wing to longer than wing) ..... *Zenaidura*
    ff. Tail shorter, rounded rather than graduated (less than two-thirds as long as wing) ..... *Zenaida*
  ee. Rectrices 12, the tail less than three-fifths as long as wing; tarsus nearly one-fifth as long as wing; bill decurved; smaller wing-coverts spotted or streaked; no subauricular spot, but a pale auricular band margined above and below by a black line) ..... *Nesopelia*
dd. Wings immaculate, the distal coverts white ..... *Melopelia*

The species included under each of these genera as given in the text, including extralimital (South American) forms mentioned in keys and footnotes by Ridgway, are:

Zenaidura macroura macroura (Linn.)
Zenaidura macroura clarionensis Towns.
Zenaidura macroura carolinensis (Linn.)
Zenaidura macroura marginella (Woodh.)
Zenaidura macroura tresmariae Ridgw.
Zenaidura graysoni Lawr.
Zenaidura yucatanensis Lawr.
Zenaida zenaida zenaida (Bonap.)
Zenaida zenaida lucida Noble
Zenaida zenaida yucatanensis Salvad.
Zenaida spadicea Cory
Zenaida aurita (Temm.)
Zenaida ?plumbea Gosse
Zenaida auriculata Des Murs
Zenaida ruficauda ruficauda Bonap.
Zenaida ruficauda robinsoni Ridgw.
Zenaida ruficauda vinaceorufa Ridgw.
Zenaida ruficauda jessiae Ridgw.
Nesopelia galapagoensis galapagoensis (Gould)
Nesopelia galapagoensis exsul Roths. and Hart.
Melopelia asiatica asiatica (Linn.)
Melopelia asiatica mearnsi Ridgw.
Melopelia meloda (Tschudi)

This list is given here in full, partly for convenient reference and partly for the purpose of having it readily available for comparison with the proposed rearrangement to be found at the end of this article.

An examination of the various forms listed in an effort to "work" the key shows

that the arrangement is quite impossible, the most serious objection being found under paragraph *e* in the key where it reads "rectrices 14.....*Zenaidura*." As a matter of fact, *Zenaidura* does possess 14 rectrices, but so do *Zenaida auriculata* and *Zenaida ruficauda;* on the other hand *Zenaida zenaida* and *Zenaida aurita* have but 12. *Z. plumbea* of course has not been seen; it became extinct before any specimens were preserved, and since it may not belong here, it may safely be excluded from further consideration.

The species with 14 rectrices are *Zenaidura macroura, Z. graysoni, Z. yucatanensis* (of which more later), *Z. auriculata* and *Z. ruficauda.* Those with 12 are: *Zenaida zenaida* and *Z. aurita, Melopelia* and *Nesopelia.* Both Ridgway and Salvadori insist on 14 rectrices for *Zenaida* which is certainly correct for *auriculata* and *ruficauda,* but *zenaida* and *aurita* have but 12, a fact which I have repeatedly verified not only in making tail counts of some forty skins but also from careful examination of four *zenaida* recently examined in the flesh. Another statement under section *e* of the key that I question is "tarsus less than one-sixth as long as wing"; this holds true for the races of *Zenaidura macroura* and for *Zenaidura yucatanensis,* but breaks down when applied to *Z. graysoni.*

Grouping the birds with fourteen rectrices, we find an association of species that is quite uniform in color and markings, proportions of bill, wings and tail. *Z. macroura* and *Z. graysoni* have a much graduated tail with the central rectrices elongated and pointed, but this is the only feature not shared by the other members, in which the four outer pairs of rectrices are graduated and the three inner pairs are of approximately the same length. *Z. m. clarionensis* and *Z. graysoni* have stouter feet and tarsi than their relatives on the mainland and in the West Indies; *Z. graysoni* while undoubtedly derived from *macroura* stock has developed longer as well as stouter bill, feet and tarsi; while its color pattern remains the same, its very great increase in depth of color taken together with its stout bill and feet merits its specific distinctness. *"Zenaida" auriculata* of southern South America is practically a counterpart of *Zenaidura macroura* except for the elongated central rectrices. Recently, Mrs. Naumburg has shown conclusively (Amer. Mus. Novitates, no. 648, 1933) that the other South American "Zenaidas" (the *ruficauda* group) are but subspecifically distinct from *auriculata.* In view of the similarities noted I should unhesitatingly transfer *Zenaida auriculata* to *Zenaidura.*

Zenaida zenaida, Z. aurita, Melopelia and *Nesopelia* all agree in having a rounded tail of twelve rectrices; tarsus proportionately longer and heavier than in *Zenaidura* (except *graysoni*). *Nesopelia* by reason of its short tail, but little over one half the length of the wing, and strongly decurved bill is at once set apart from the other species and may be maintained as generically distinct. Its affinities are not clear; it bears a faint general resemblance both to *Zenaida aurita* and to *Melopelia asiatica,* but its peculiar bill differentiates it from either. This member is much decurved, the dertrum is long and extended back on the upper mandible, encroaching on the basal portion almost to the nasal operculum.

I have looked in vain for any characters of generic value that would serve to distinguish the Zenaida Doves and the White-winged Doves; their proportions are practically identical, the color pattern is of course different, and *Melopelia* has a large bare circumorbital space and a longer heavier bill; but these are characters certainly not very trenchant. As an example of the way proportions may vary within the species I may point out that typical *Melopelia asiatica* from the West Indies has a shorter bill than the continental forms, *mearnsi, australis* or *meloda,* but its wing-tail ratio is 72 as against 67 to 69 for the two former, jumping up to about 74 in the latter. *Zenaida* in its narrow sense has a wing-tail ratio of about 67. I can see no reason

for placing *Zenaida aurita* in one genus and at the same time maintaining *Melopelia* as distinct. I therefore lump the two under *Zenaida* Bonaparte 1838, which has many years priority over *Melopelia* Bonaparte 1855.

In closing, just a word about *Zenaidura yucatanensis* Lawrence. Salvadori and Ridgway both suspected this bird of being a hybrid, both pointing out that it was exactly intermediate between a Mourning Dove and a Zenaida Dove. Ridgway went so far as to say that should it ever prove to represent a distinct species, then the further separation of *Zenaidura* and *Zenaida* (as he defined the two genera) was no longer possible. I personally have examined the type and agree entirely with Salvadori and Ridgway that it does represent a hybrid; furthermore, being convinced that it is a hybrid I propose to treat it as one and drop it from further consideration.

If the views expressed in this paper are accepted, the genera discussed will then be constituted as follows; the question of recognition of certain subspecies will probably not differ greatly.

Zenaidura macroura macroura (Linn.)
Zenaidura macroura carolinensis (Linn.)
Zenaidura macroura marginella (Woodh.)
Zenaidura macroura tresmariae Ridgw.
Zenaidura macroura clarionensis Towns.
Zenaidura graysoni Lawr.
Zenaidura auriculata caucae (Chapm.)
Zenaidura auriculata hypoleuca (Bonap.)
Zenaidura auriculata auriculata (Des Murs)
Zenaidura auriculata virgata (Bert.)
Zenaidura auriculata noronha (Sharpe)
Zenaidura auriculata marajoensis (Berlepsch)
Zenaidura auriculata jessiae (Ridgw.)
Zenaidura auriculata rubripes (Lawr.)
Zenaidura auriculata ruficauda (Bonap.)
Zenaidura auriculata antioquiae (Chapm.)
Zenaidura auriculata vinaceorufa (Ridgw.)
Zenaida aurita yucatanensis Salvad.
Zenaida aurita zenaida (Bonap.)
Zenaida aurita aurita (Temm.)
Zenaida asiatica mearnsi (Ridgw.)
Zenaida asiatica asiatica (Linn.)
Zenaida asiatica australis (Peters)
Zenaida asiatica meloda (Tschudi)
Nesopelia galapagoensis galapagoensis (Gould)
Nesopelia galapagoensis exsul Roths. and Hart.

Zenaida spadicea Cory and *Z. lucida* Noble are synonyms of *Zenaida aurita zenaida*.

My best thanks are due Dr. Herbert Friedmann for the loan of the unique type of *Zenaidura yucatanensis* and a pair of *Zenaidura graysoni*; I am similarly indebted to Mr. J. T. Zimmer for the loan of a pair of *Zenaida asiatica meloda* from western Peru.

Museum of Comparative Zoology, Cambridge, Massachusetts, June 11, 1934.

FROM FIELD AND STUDY

Feeding Habits of Herons on Mission Bay, California.—The Blue Heron (*Ardea herodias*) stood knee-deep in the water. Gaunt, alone and silent he might have been cast in bronze to picture eternal patience. His was the pose of frozen alertness—he was waiting, waiting for some luckless victim to swim within striking distance of his spear-like bill. Patience shall have its reward and all things come to him who waits. A light-fast stab, a flash, a splash, and the Blue Heron eats. This is his method of fishing.

The Blue Heron stood in a channel of the slough. It was low tide and all about him lay acres of uncovered mudflats. Among the hundreds of long-legged shore-birds that were scattered over the mudflats were other representatives of the heron tribe. Each representative had its own peculiar feeding habits and its own mannerisms.

The Blue was the largest heron. The next in point of size and nearest in feeding habits was the American Egret (*Casmerodius albus egretta*). In all his snowy white-

ness he stalked his prey along the shallow margin of the channel. The personification of stealth was pictured in his every movement. He moves forward with stately grace, each measured step paced with caution. He suddenly freezes, and now one can almost sense the gleam of his piercing eye. Cautiously, slowly he stretches his long neck forward, a foot is lifted, it moves, one stride forward, perhaps two strides. And now he assumes the out-stretched attitude of frozen eagerness. With perfect balance, without a flicker of movement he holds this pose until sure of his kill. A flash of gleaming whiteness, an upward toss of his head, a gulp or two and down goes the latest victim of his uncanny skill. Perhaps he shakes his feathers out a bit and he may reach down his long bill to adjust a feather or two. He now lifts high his head and looks about before moving on to the site of his next kill.

Then there is the little Snowy Egret (*Egretta thula*) who stalks the pools that lay scattered over the mudflats. No pool is too small to receive his attention. Walking slowly and quietly with a dignified stride, but lacking the stealthy alertness of the American Egret, the Snowy moves along. He is foraging and when he comes to a likely looking puddle he reaches one foot gently forward and with toes outspread he softly pats the surface of the pool. In this gentle way, without muddying the water, he stirs up any small fish that may be hiding in the pool, and in the clear water he is able to see and spear his fleeing victim. This foraging maneuver was about as clever a thing as I ever saw a bird do. He reached out so deliberately and patted so gently, and with his patting foot directly under his bill he was ready to strike with precision.

Besides these three there was the "Interloper"—a stranger from a foreign land who did not really belong on the mudflats of Mission Bay. When first seen he was quarreling with the Snowy Egret. He would crouch low, lean forward and out-stretch his neck, ruffle his shoulder feathers and run toward the Egret. Occasionally as he drew near the Snowy he would leap into the air and strike with his wings. In this manner, the Snowy retreating and the Interloper pursuing, the birds crossed a hundred yards of mudflat and then the Snowy took wing. The Interloper, not satisfied, continued the pursuit. He was the larger and the stronger on the wing. The Snowy was forced to dodge, turn, and dive as the birds winged far over the mudflats. Finally the two birds disappeared in the distance.

Ten minutes later the Interloper came sliding down the breeze to the section of the mudflat where he was originally seen. Now, no longer forced to share his feeding ground, he immediately started to forage. Again we were thrilled; never before had we seen a heron-like bird forage in such a strange manner. Instead of the slow stealthy movements of most herons this bird fairly raced about. His slowest movements were paced in a hurried trot, but most often he ran at a more rapid gait. But not only that, often when racing through a shallow pool he would leap into the air, turn about and land, racing in the opposite direction. Seemingly his method was to stir the fish into action and then to spear them on the run.

In his odd manner of foraging the Interloper covered much territory. When running he held his neck in a close S-shaped crook and this attitude coupled with his sudden upward leaps and his quick jerky side-steps gave to his hunting performance a most ludicrous aspect. Really he was an acrobat of parts. [The "Interloper" turned out to be the Louisiana Heron (*Hydranassa tricolor ruficollis*), a rare visitor to California recorded a few times from the vicinity of San Diego.]—CHAS. W. MICHAEL, *Yosemite, California, June 4, 1934.*

Notes on the Nesting of the Band-tailed Pigeon.—There are a number of recorded instances of the nesting of the Band-tailed Pigeon (*Columba fasciata*) in the higher country of California; still a few notes on breeding in the lower elevations may prove of interest. In Pacific Coast Avifauna number 21, by George Willett, there is a record of the breeding of this bird as noted by me in the Oak Knoll district of Pasadena. This I thought, at the time (1928) an unusual occurrence. Since the date of finding that nest, I have been able further to observe the breeding habits of this pigeon in California.

My notes record the finding, on June 18, 1932, of a nest containing one newly hatched young on the Spring Valley Water Company property in San Mateo County. The nest was placed about twenty feet up in a redwood in a heavily wooded gulch directly to the westward of San Andreas Lake. While I searched diligently for other

nests, I was able to locate only this one on the water company's land, even though several different days were spent afield in this quest.

In company with Dr. Ralph A. Woods of Los Angeles, a day was spent in the vicinity of Calabasas, Los Angeles County, chiefly looking for nests of raptors. In a grove of small scrubby live oaks, a nest containing one pipped egg of a Band-tailed Pigeon was found. The nest was typically constructed, being placed about fifteen feet up on a horizontal limb. The female flushed from the nest and was not seen or heard again while we remained at the site. Mr. W. J. Sheffler of Los Angeles informs me that several years ago while hunting in this vicinity in the autumn, he noted old pigeon nests. Incidentally, a ranchman with whom Dr. Woods and I talked on March 19, 1934 (the date of discovery of this nest) declared that "several" years ago there were a number of birds on his place throughout the year, but that he had not seen any since that time. Had this female not noisily flushed from her nest, I would not have known a pigeon was in the canyon, for no sign of another individual was seen or heard.

A comparison of breeding dates seems of interest. In contrast with the early nesting at Calabasas, in March, and the June date from San Mateo County, I have other dates in my notes from the Sierra Nevada, notably from Lopez Flat on the Tejon Ranch, Kern County, in the Tehachapi Range (one egg fresh, on May 27, 1928), and from the upper Tule Canyon, Tulare County (one well-fledged young in nest on July 28, 1926).—J. STUART ROWLEY, *Alhambra, California, June 14, 1934.*

Magpie Spends Second Winter at Florence Lake.—On December 3, 1933, the first of our partly tame coyotes returned for the winter. This was Tom, who had been with us the two previous winters. And with him on the feeding ground that very first morning was Skäta, a Black-billed Magpie (*Pica pica hudsonia*) (see Condor, 35, 1933, p. 198)—if not Skäta, at least one of her kind. From its actions we felt sure it was the same individual that had spent the previous winter with us, sharing this same coyote's food.

The winter of 1933-34 was quite the mildest we have seen at Florence Lake, and the coyotes (Tom, Nelly and Lobo, a new one—Dick failed to return) did not find it necessary to depend so much upon the food we furnished for them. However, they came every day or so and Skäta was always with them when they came, and left when they left. Not once did this magpie feed with the birds on the side of the house opposite from the pups' feeding ground.

Nelly and Lobo were mates and while they made no attempt to kill this bird they showed quite plainly they did not care to share food with it. However, Tom was, as usual, hospitable, and throughout the winter the coyote and the magpie dined side by side. But again when March arrived, Skäta left the coyote companion, probably to join her fellow-magpies on the "east-side" somewhere.—LILA M. LOFBERG, *Big Creek, California, April 25, 1934.*

Miscellaneous Notes on Birds of the Sacramento Valley.—During many field trips of the past three seasons I have entered in my notebooks several records that appear to warrant publication. No extensive search of the literature concerning the species mentioned has been made, but these observations appear to add to the picture of each of these birds.

Gallinula chloropus cachinnans. Florida Gallinule. Listed both by Hoffmann and in the more recent A. O. U. Check-list as wintering "from southern California southward". Florida Gallinules are really regular winter residents of all parts of the Sacramento Valley rice-growing area. I have definite dates of their occurrence covering each of the winter months in Butte, Glenn, Colusa, Yuba, Sutter, and Yolo counties. They do not appear to winter in large numbers, but one or more individuals can be located practically any day during the winter by a few minutes scouting along the canals or sloughs. My most recent record was that of a pair noted by Warden Black and the writer on the St. Germain Gun Club, Suisun marshes, December 18, 1933.

Dendrocygna bicolor helva. Fulvous Tree-duck. Two specimens of the Fulvous Tree-duck were killed on the Spalding Ranch Gun Club, near Willows, California, by H. Joseph. The last of the two, killed about November 21, 1933, was mounted and is

on display at Hotel Barton, Willows. Other mounted specimens of this species were noted in several duck club lodges. It appears that this species may not be so rare in the Sacramento Valley area as the dearth of literature concerning its occurrence indicates.

Egretta thula. Snowy Egret. Several records of the occurrence of the Snowy Egret in the Sacramento Valley are at hand, and will be listed briefly. May 29, 1931, one, Plumas Lake, Yuba County; December 22, 1932, two, 3 miles east of Maxwell; March 2, 1933, one, 4 miles southeast of Willows; April 18, 1933, one, close to the last named place; June 6, 1933, two, in flooded rice-field 9 miles west of Gridley; November 27, 1933, one, on a gun club near Maxwell; December 26, 1933, five, feeding within a short distance of one another along a canal 4 miles north of Williams. Of these observations, that of December 22, 1932, was of especial interest, since it was just a few days after the end of a bitterly cold period. In every case listed these birds were in company with the larger American Egret and with other herons, so they could easily be compared in detail.

Elanus leucurus majusculus. White-tailed Kite. In 1932, I published a record of this species noted on Conoway Ranch, some miles west of Sacramento (Condor, 34, 1932, p. 259). New information is of interest. On November 16, 1933, Inspector W. G. Duncan, Agricultural Commissioner's office, Woodland, California, had occasion to traverse parts of this same ranch property. Under a willow tree about 1½ miles west of the place where the species was previously observed he found the well-preserved body of a White-tailed Kite, evidently shot the day before by pheasant hunters; its mate flew about overhead for some minutes before disappearing over the trees. The dead bird was delivered to Professor Hopkins, of the Esparto High School, for verfication of the identification. Because of the proximity of the two localities, it does not seem at all impossible that the same pair of kites remained on and around that identical area for the period covered by the two records.—JOHNSON A. NEFF, *Bureau of Biological Survey, Sacramento, California, April 1, 1934.*

The Race of Cowbird in the San Francisco Bay Region.—In increasing numbers have the eggs of cowbirds been found in the San Francisco Bay region since their initial discovery in 1922 near Irvington, Alameda County (La Jeunesse, Condor, 25, 1923, p. 31; see also Grinnell and Wythe, Pac. Coast Avif. No. 18, 1927, p. 104). It is quite possible, too, that cowbirds were present in the region prior to 1922. For there are earlier reports, though not as authentic as could be desired; for example, of "Sagebrush Cowbird" from "Gilroy, California" in 1912 (Oberholser, Bird-Lore, 22, 1920, pp. 343, 344). At any rate, save for a vagrant of the race *artemisiae* taken on the Farallon Islands (Dawson, Condor, 13, 1911, p. 181) no adult specimen has been available from which to determine subspecific status.

Just now, through the vigorous and successful efforts of Mr. Henry W. Carriger, who of late years has collected many of the eggs of *Molothrus* in the Bay region, the Museum of Vertebrate Zoology has come into the possession of an adult pair of the birds. They were taken on May 26 and 27, 1934, within the eastern city limits of Oakland, Alameda County, and are preserved under Mus. Vert. Zool. nos. 64963-64. They show measurements, respectively, as follows: ♂, wing 106.3 mm., tail 73.5, tarsus 24.7, culmen 16.6, depth of bill at base 9.3, weight 39.2 grams; ♀, wing 90.5, tail 60.2, tarsus 22.3, culmen 13.3, depth of bill at base 8.3, weight 27.8 grams.

Molothrus ater californicus Dickey and van Rossem (Condor, 24, 1922, p. 208) was named from specimens from the southern (upper) end of the San Joaquin Valley. From the date of that description up to the present occasion I have been of the opinion that *californicus* is a fairly recognizable race, upon basis of the characterization given by its describers. However, doubts have lately been expressed by other persons. Friedmann (Auk, 44, 1927, pp. 504, 505) synonymizes *californicus* under *obscurus;* and the same author only this year (Wilson Bull., 46, 1934, p. 28) reiterates his belief that it [*californicus*] is "the same as the Dwarf Cowbird." Willett (Pac. Coast Avif. No. 21, 1933, p. 156) expresses the same view, in part in the following words: "*Californicus* is apparently an intergrade between *obscurus* and *artemisiae,* somewhat nearer the former. The naming of intergrades is a practice that may be continued indefinitely and cannot but lead toward nomenclatural chaos. With this in mind, *californicus* is here included with *obscurus,* from which it differs very slightly."

Now, with the above opinions before me, and after an examination just made of all the molothrine material in the Museum of Vertebrate Zoology (166 skins) in connection with the Dickey-van Rossem description, I am compelled to conclude that *californicus* is not usefully recognizable, having been based upon a sort of mosaic of intergrades. Indeed, this situation is quite what the reader gathers from the remarks of the authors of this name, themselves. To re-state the case as I now see it, I could do no better than use the words quoted above from Willett.

To return to the two birds from Oakland, the measurements I give above show the female to be even smaller than the average of a Colorado River valley series (for measurements of this, see Grinnell, Univ. Calif. Publ. Zool., 12, 1914, pp. 159-160). The male, however, is larger with respect to wing and tail than any Colorado River example, but is identical in size with specimens from Owens Valley, these latter clearly being intergradient between *artemisiae* and *obscurus*. As to coloration, the female is a bit more slaty in its dark tones than Colorado Valley examples, but the latter, even of approximately the same season, are obviously more worn; as is well known, progressing wear carries gray toward brown. I cannot see that the obscure, narrow streaking below is any more emphasized than in some southeastern birds. In the male the brown color of the head is darker than in most Colorado River males, and there is a faint iridescent "wash" over it; but I suspect that a little wear and fading from strong sunlight would reduce these features to a perfectly equivalent condition.

To repeat, then, the newly-acquired specimens from the San Francisco Bay region would seem to decide the name Dwarf Cowbird (*Molothrus ater obscurus*) as the one best to use for the race of that area along with western and southern California generally.—J. GRINNELL, *Museum of Vertebrate Zoology, Berkeley, California, June 10, 1934.*

The Cowbird Breeds in Berkeley.—On June 9, 1934, we captured a young Cowbird (*Molothrus ater obscurus*) near Sather Gate on the University of California campus. It was being attended by a Western Flycatcher (*Empidonax difficilis*). To our knowledge this is the first record of the Cowbird in Berkeley and also the first record of the Western Flycatcher as a host for this species.

We first saw the Cowbird on June 8 in the trees bordering Strawberry Creek. While we were watching it the much smaller Western Flycatcher approached and fed it. Our attempts to capture the fledgling by hand were failures because the young bird flew too well. The Western Flycatcher was most solicitous of its charge, expressing alarm at our presence, driving away a Robin, a Titmouse, and some Bush-tits which were attracted by the fledgling's begging calls, and feeding it at frequent intervals. The flycatcher followed the Cowbird more often than the Cowbird followed the Flycatcher.

The fledgling was a male weighing 26.5 grams. Its gullet and stomach contained a mass of insect remains which included two ladybird beetlets and a syrphid fly. The specimen is now no. 64966 in the collection of the Museum of Vertebrate Zoology.—SETH B. BENSON and WARD C. RUSSELL, *Museum of Vertebrate Zoology, Berkeley, California, June 15, 1934.*

Fig. 38. Nestling Double-crested Cormorants at Lake Bowdoin, Montana.

The Nesting of the Double-crested Cormorant at Lake Bowdoin, Montana.—Because of a recent inquiry about the breeding of Cormorants in Montana I am placing the following note on record. The first time I visited Lake Bowdoin, June 19 to 22, 1932, and the last time, June 18 to 23, 1933, we found ten or twelve pairs of Double-crested Cormorants (*Phalacrocorax auritus auritus*) nesting on Woody Island. Probably

about this many birds have nested on Lake Bowdoin for the past ten or twelve years. The first authentic record that I can find comes from Mr. George E. Mushbach, Superintendent of the Bear River Migratory Bird Refuge, and dates back to June, 1927. In a recent letter Mr. Mushbach states that in 1927, when at Lake Bowdoin, Mr. L. Minugh, who had been Game Warden on the lake for many years, told him that Cormorants had nested on the lake for a number of years. No specimen has been taken and preserved from Lake Bowdoin, though I have seen several that have been shot during the hunting season. The accompanying picture (fig. 38) should serve as well as a specimen.—V. L. MARSH, *Great Falls, Montana, May 26, 1934.*

The Status of Phalaropus fulicarius jourdaini Iredale.—Mr. Tom Iredale's race of *Phalaropus fulicarius* has indeed been unfortunate in its critics! I have just read with interest Mr. J. L. Peters' note in the Condor (36, 1934, p. 85) in which he gives the results of his inquiry into the validity of this form. As far as can be ascertained from this paper the material consisted of birds from Southampton Island, the coast of Labrador, and the *west* coast of Greenland (all breeding birds). There were also specimens from the Massachusetts coast on spring migration, and others from northeastern Asia and northern Alaska. To which place the East Siberian and Alaska birds belong I am unable to say, as I have never examined series from these localities; but leaving these out of the question, all the material examined belongs to the typical race, and apparently there is not a single specimen of *P. fulicarius jourdaini* among them! The only known breeding places of this race are Spitsbergen, Iceland and the northeast coast of Greenland. Surely before passing judgment on the validity of a form, it is desirable to have specimens available for comparison. The late Mr. E. Lehn Schioler had beautiful series from both the northeast and northwest coasts of Greenland, collected during the breeding season, and every ornithologist who has examined these series has noticed the differences pointed out by Iredale. It is a well known fact that the avifauna of northeastern Greenland is Palearctic, and birds arrive there from the east Atlantic; while the northwestern coast is predominantly Nearctic and breeding birds arrive from the west side of the Atlantic.

That gradual bleaching takes place as summer advances in both forms is admitted, but Colonel Meinertzhagen, who disputed the validity of the new race on the same grounds as Mr. Peters, was forced to propound a theory that the warm current off the east coast induced earlier breeding and bleaching than the cold climate of the west coast of Greenland, to account for the paler color of the east Greenland birds. As this is exactly the reverse of the facts, the northeast coast being icebound with a cold Arctic current, and the west coast ice-free owing to the warm stream from the south, the argument recoils against its author.

Dr. E. Hartert, too, made an unfortunate slip in his Vögel d. pal. Fauna (III, 1922, p. 2212) when he stated that pale summer birds had been compared with fresh dark autumn specimens. In autumn this species has of course already assumed its winter plumage. It is only fair to add that at Copenhagen in 1926 he examined Mr. Schioler's series and admitted his mistake, but unfortunately did not live to correct it in his Erganzungsband.

Comparisons based on series of one form only are certainly "misleading and only create erroneous impressions", to quote Mr. Peters' words.

It is perhaps not without interest that while the typical race migrates south at least to the Falklands, the east Atlantic form does not occur south of the equator, while the supposed records for the Indian Ocean are due to confusion with *Phalaropus lobatus*. It has also been recorded from the British Isles in every month of the year except July.—F. C. R. JOURDAIN, *Whitekirk, Southbourne, Bournemouth, England, May 5, 1934.*

Further Comment on Phalaropus fulicarius jourdaini.—To Mr. Jourdain's criticism of my disposal of the name *Phalaropus fulicarius jourdaini* Iredale I would reply as follows:

Mr. Jourdain bases his defence of this subspecies chiefly on the fact that I did not have a topotypical specimen at hand. He overlooked my statement, however, (6th line from bottom of third paragraph, p. 85 of this volume of the Condor) that I had

examined specimens from the east coast of Greenland, a locality which from his own admission he considers to be inhabited by the same race as that occurring in Spitsbergen. The two east Greenland birds, both females, that I examined were taken on Shannon and Sabine islands, off the northeastern coast of Greenland, June 8 and 20, respectively. Both of these have the edges of the feathers of the dorsal surface colored exactly like breeding females from west Greenland, Southampton Island, northern Alaska and northeastern Siberia, taken near the same dates; that is, not as bright as fresh plumaged migrants nor as abraded and dulled as birds collected about the first of July. There is some variation in the depth of color and the amount of wear among birds taken at the same place and date, but in any long series it will be noted that there is also some variation in the dates on which the full nuptial plumage is attained.

I still maintain that the character on which the race *jourdaini* was based is entirely a matter of wear and abrasion of plumage.

Mr. Jourdain does not give the dates on which Schioler's series from west and east Greenland were taken, so it is not possible to judge how nearly seasonally comparable they are; nor does he say whether the ornithologists who maintain *jourdaini* as distinct do so on the original character on which it was based or on some other character not mentioned either in the original description or in Jourdain's article.

In closing, I would add that should any European ornithologist care to measure a long series of breeding birds from east Greenland, Iceland *and* Spitsbergen (measuring the chord of the wing with calipers to avoid the error of personal equation present if ruler is used) I shall be only too pleased to do the same with a North American series and forward my measurements for his use. If any constant and appreciable difference in size between the birds from the two sides of the Atlantic can be discovered, I shall certainly lend my support to a race based on this character.—JAMES L. PETERS, *Museum of Comparative Zoology, Cambridge, Massachusetts, June 25, 1934.*

New Bird Records from the Pleistocene of Rancho La Brea.—While working with the bird remains in the Rancho La Brea collection at the University of California, three species hitherto unrecorded from this deposit have come to my attention. They are the Goshawk (*Astur atricapillus*), the Long-billed Curlew (*Numenius americanus*), and the Hudsonian Curlew (*Phaeopus hudsonicus*). The fossils upon which these records are based are from locality 1059.

Astur atricapillus. Right femur, Univ. Calif. Mus. Paleo. no. 30936. Length, 84.6 mm. The external condyle and the greater portion of the popliteal area are broken away. This fossil is identical with specimens of the modern Goshawk. The femurs of the Red-tailed Hawk (*Buteo borealis*) and the Goshawk are approximately the same size but that of the Goshawk is readily identified by the raised circular muscle scar above the popliteal area. In the Red-tail this scar is a thin transverse line above the external condyle. The fossil shows a moderate amount of wear on the margins of the external condyle and the trochanteric ridge.

Numenius americanus. Right tarsometatarsus, U. C. Mus. Paleo. no. 30938. Length, 86.2 mm.; transverse width proximal end, 10.9 mm.; transverse width distal end, 9.9 mm.; smallest transverse diameter of shaft, 3.7 mm. The specimen is in good condition, although the margins of the middle trochlea are worn and the shaft has a few rubbed and scratched areas. This bone cannot be distinguished from specimens of the present-day Long-billed Curlew and measures 1.7 mm. shorter than an adult of this species (Mus. Vert. Zool. no. 54886).

Left coracoid, U. C. Mus. Paleo. no. 30939. Length, 37.8 mm. This specimen is also identical with the Long-billed Curlew and agrees closely in size with the Recent specimen mentioned in the preceding paragraph, the coracoid of which measures 38.6 mm. in length. In the fossil specimen, the margin of the shank posterior to the scapular facet is flattened and enlarged into an area almost the size of the glenoid facet. I found this peculiar condition to exist also in both coracoids of a specimen of the Hudsonian Curlew (*Phaeopus hudsonicus*, Mus. Vert. Zool. no. 46033, ♀). In this individual the internal tuberosity of the bicipital crest of the humerus articulated with this pseudo-facet. An examination of the rest of the skeleton showed the bird to have recovered from wounds in the right tarsometatarsus and in the deltoid crest of the left humerus.

Phaeopus hudsonicus. Distal three-quarters of right humerus, U. C. Mus. Paleo. no. 30940. Complete except for head. Length from internal condyle to deltoid crest, 59.4 mm.; transverse width of distal end, 11.4 mm. This fossil is indistinguishable from the corresponding bone of the present-day Hudsonian Curlew. The single specimen examined of the Bristle-thighed Curlew (*P. tahitiensis*) presented a definitely heavier shaft than the fossil or any of a series of four Hudsonian Curlews. Except for the missing head the fossil is in almost perfect condition. The condyles and ridges of the anconal surface are slightly worn away.—LAWRENCE V. COMPTON, *Museum of Paleontology, University of California, Berkeley, California, July 1, 1934.*

NOTES AND NEWS

With regard to articles, general or brief, accepted by the editors for publication in the *Condor*, we are not infrequently requested by an author to "change it in any way we see fit"; in other words, there is desire, apparently, to make the editors responsible for the worthiness in all respects of such articles. It is true that as a matter of practice the editors of the *Condor* do check up pretty closely on the composition of articles once accepted, emending them in various ways necessary to meet the literary standards of our magazine. Often also, to us seeming mistakes of fact or interpretation are pointed out to an author. But always these emendations and suggestions, either in manuscript or in galley proof, are sent back to the author for his review and final correction. It is the author who is responsible for the ultimate accuracy of his published contribution, not primarily the auspices under which it is printed. On this principle, the *Condor* does not print anything anonymously; reviews, editorials, and even news notes are signed, or at least initialed. Incidentally, we would call the attention of all contributors to the *Condor*, current and prospective, to the editorial statements concerning the "Preparation of Manuscript", on outside back cover of this issue. —J.G.

The Pacific Northwest Bird and Mammal Society, with headquarters at Seattle, Washington, has started a new series of publications under the title "Northwest Fauna Series". Number 1, of 28 pages, a copy of which reached us on April 4, 1934, is a "Distributional Check-list of the Birds of the State of Washington"; author, E. A. Kitchin. A total of 389 species and subspecies are entered regularly, with 39 additional ones of "Hypothetical" status. This check-list will be helpful to bird students resident outside as well as within the state of which it treats.—J.G.

Not many Cooper Club members other than those chosen few who have dedicated their lives to vertebrate zoology have had the opportunity of knowing personally Charles Dean Bunker, presiding genius of the Museum of Birds and Mammals at the University of Kansas. This Museum, famous alike for its collections and for the sound and sturdy quality of

Fig. 39. Charles D. Bunker, Curator of Birds and Mammals, University of Kansas.

scholarship inculcated in the students fortunate enough to be selected by Bunker for training, has been the starting point of a long line of distinguished contributors to all branches of the vertebrate sciences.

Bunker's fame lives chiefly in the work of his students, in whom he succeeds in imparting an undying enthusiasm and love for the work; and his genius lies in his wise selection of human material. His judicious appraisement of those qualities in a recruit on which may be built a successful career in vertebrate zoology has proven to be little short of clairvoyant, and his uniformly sound judgment in this vital particular finds reflection in the long list of serious workers to whom he has transmitted his own enthusiasms, visions, and capacity for hard work. Without a conscious knowledge of pedagogics his results with students have been those of a really gifted teacher; but probably more to the point he is a really great friend, and his boys always remember him with the warmest affection and esteem. His greatest joy in life is seeing them attain academic and scientific success, and with no thought whatever of reflected glory he fairly gloats over their every contribution to the literature.

To those whose lives are much occupied with birds, rats and snakes, friendship with Bunker is a privilege and an inspiration; there is probably nowhere in America at the present time a more stimulating or congenial rendezvous for these strange folk than his smelly old workshop in the basement of the Museum at Lawrence. That the old crowd constantly drift through there on their travels further testifies to the compelling and magnetic personality of this naturalist.—H.H.

As indicative of the further increase of interest in wild-life conservation, attention is called to the move recently made by the National Park Service in placing Wild Life Technicians in Emergency Conservation Camps. The Park Service, feeling that one of its main duties is that of conserving wild-life within the Park areas and fearing that perhaps the "clean-up" work of the men in the camps might destroy essential food and cover of birds and mammals, is taking this means of checking upon the work done and, at the same time, of gathering useful data relative to the native fauna of the Parks. These Wild Life Technicians have been chosen for their superior knowledge of animal natural history and have been placed widely throughout the United States; in some instances a properly qualified man will work in several different areas. Proper supervision will be given them by the Wild Life Division of the Park Service. Mr. Ben H. Thompson, of the Wild Life Division, George M. Wright, Chief, is in immediate charge of this work, which is conducted under the Branch of Research and Education, directed, in turn, by Dr. H. C. Bryant.—J.G.

The Eighth International Ornithological Congress held at Oxford, England, came to its close on July 10. The happy and eager body of ornithologists, of many types and races, had numbered upwards of 350 registered members. With enthusiasm engendered by the success of the meetings, delegates already are planning for the next Congress, in France four years hence.

The Congress held interest for everyone. Some found most profit in the scientific program and debate; others derived most pleasure from establishing new personal acquaintances and from conversations; and still others felt that the trips and excursions were the best features. Whatever one's inclination, each person seemed quickly to find his own ornithological niche and dwelt comfortably in it.

The restriction of the scientific program to the forenoon of each day was widely appreciated, as members then did not weary of attendance upon sections. Of special interest were the debates, one led by Colonel R. Meinertzhagen on the influence of environment on coloration and another led by Professor J. S. Huxley on types of behavior in birds. Among life history photographs shown, Herr Siewert's pictures of the Osprey were extremely artistic and complete in their depiction of every detail of habit. Topics that appeared to figure prominently in the program were homing instincts, hormone control of pigmentation in feathers, the principle of nomina conservanda and modern methods in systematics, and the conservation of birds.

The culminating feature was the week-end trip across Wales to the sea bird islands of Pembrokeshire. The trip by water was made on two British destroyers; the weather was perfect and the birds were on best behavior. The immense colonies of Puffins, Razorbills and Guillemots, with many other species, afforded an experience to non-British visitors long

to be remembered.

Too much credit cannot be given to the English Committee that planned the meetings, and special praise must be accorded the fine work of Secretary Jourdain and Mr. B. W. Tucker. Oxford was an excellent meeting place. President Stresemann's conduct of the meetings was admirable; his manner of presiding and his scientific leadership were ideal.—A.H.M.

MINUTES OF COOPER CLUB MEETINGS

NORTHERN DIVISION

MAY.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held at 8:00 p. m., Thursday, May 24, 1934, in Room 2003, Life Sciences Building, Berkeley, with President Pickwell in the Chair and about seventy members and guests present. Minutes of the Northern Division's April meeting were read and approved, and minutes of the Southern Division's April meeting were read.

Applications for membership were: Mr. Edward Avery McIlhenny, Avery Island, Louisiana, by Joseph Mailliard, and Miss Hope M. Gladding, 58 Tamalpais Road, Berkeley, California, by E. L. Sumner through the Western Bird-banding Association. A United States government press communication announcing the death of Dr. Edward W. Nelson and giving an account of his life and of his scientific career was read by the Secretary.

Mr. E. L. Sumner reported a second nest built by the Richmond Mockingbirds, containing three young, banded May 23; Mr. Dexter, Mrs. Bracelin and Miss Sanford gave accounts of local robins' nests; Mr. McClintock told of the finding of Black-chinned Sparrows on Las Trampas Ridge and Mr. Tonkin of a nesting colony of American Egrets near the Pacific Highway. Migrating Tanagers were noted by Mr. Pickwell at Alum Rock Canyon on May 18 and by Miss Wythe in Berkeley on May 20. Miss Rinehart saw the Olive-sided Flycatcher on May 2 and young Chipping Sparrows in the nest on May 15.

Mr. Cain told of the efforts of a young scout to attract birds to a back yard that was completely paved. Several Christmas trees furnished cover, water was provided, nesting boxes put up and he was rewarded by the nesting of a pair of bluebirds. Gordon Bolander reported the presence of seven Least Terns at Dumbarton Bridge on May 20, and Mrs. Stephens found Yellow-billed Magpies in Tesla Canyon on April 29. Prof. Morley read extracts from a diary written in 1830 telling of the destruction of migrating Passenger Pigeons—830 dozen were taken in a season and sold for 25 cents to $1.00 per dozen. Later, in 1870, they were still so plentiful that they were caught in nets and killed by crushing the skull with the thumb or biting into it with the eye-teeth.

The third and last contest program consisted of two talks: One by Robert Taylor on "Back-yard Birding"; the other by Miss Alice S. Mulford on the "Ecology of the Brewer Blackbird on the University Campus". These were followed by interesting comments and discussion, after which the meeting adjourned.—AMELIA S. ALLEN, *Secretary pro-tem.*

JUNE.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held at 8:00 p. m., Thursday, June 28, 1934, in the Life Sciences Building, Berkeley, with Mr. Grinnell in the Chair and forty members and guests present. Minutes of the Northern Division for May were read and approved. Minutes of the Southern Division and of the Stanford Chapter for May were read.

Applications for membership were: Miss Vivian Giles, 909 Clay St., Ukiah, Calif., proposed by J. Grinnell, and Mrs. J. R. Winblad, 575 Pierce St., San Francisco, Calif., proposed by Mr. E. L. Sumner, through the Western Bird-banding Association. Mrs. James T. Allen, reporting for the Contest Committee, announced that the award to a junior speaker would be given to Mr. Cranson L. Hopkins for his talk entitled "Random Observations on Barn Owls", and the senior award to Mrs. Junea W. Kelly, who spoke on "Rock Decay and its Ornithological Significance". The awards are to consist of books on birds and are to be given to the recipients at the September meeting. A motion was made by Mr. Pease, duly seconded and unanimously adopted, that the Northern Division record its appreciation of the work of the Contest Committee in ably planning and carrying out a series of programs so well worth while.

The program of the evening was the general reporting of "Field Notes", and the Chairman called first for observations on Mockingbirds in the East Bay region. Observations of five members confirmed

the fact that Mockingbirds are established and increasing in this area. Mr. Dexter reported upon a large flock of Horned Larks noted at about 1300 feet elevation in the Livermore Hills on June 8; Miss Pringle upon the presence of many nesting Allen Hummingbirds in Golden Gate Park and the relative scarcity there of Anna Hummingbirds; Mrs. Allen upon the presence of a young Red-breasted Nuthatch in her neighborhood and on seeing Nuttall Woodpeckers in Strawberry Canyon; Miss Josephine Smith upon the apparent fearlessness of a Brown Towhee and a Santa Cruz Song Sparrow which fairly asked for food on five successive days from persons lunching on the steps of California Hall; Miss Erickson on hearing a Crow near the head of Dwight Way, these birds being very rarely noted in Berkeley of late years, although, as recalled by the Chairman, Walter E. Bryant of Oakland collected Crows' eggs where the Center Street entrance to the University Campus now is, back in the '80's. Mr. Compton made interesting observations on birds seen in Nevada between April 29 and May 22. Dr. Taylor stated that he had seen a Brown Towee stop to strike at its reflection in a window while carrying food, and Dr. Ritter added that he had also observed a similar action.

The evening closed with a review by the Chairman of the second volume of Peters' "Birds of the World". The reviewer commended the author's rulings toward the recognition of fewer genera.

Adjourned.—HILDA W. GRINNELL, *Secretary.*

STANFORD CHAPTER

MARCH.—The third regular meeting of the Stanford Chapter, Northern Division of Cooper Ornithological Club, was called to order by President Willis Rich at 8 o'clock, Thursday, March 1, in Room 430, Jordan Hall, Stanford University. The minutes were approved as read. Mrs. Rigden was proposed by Dr. McCracken for membership. Under the heading of new business the question was raised of the advisability of the change of meeting date from the third Friday to the first Thursday of the month. After some discussion, Dr. McCracken and Miss Baldwin were appointed as a committee of two, to investigate the advisability of changing the date to a time that would be more suitable to everyone.

There was a preliminary report concerning the question of destruction of salt marsh bird refuges, to the effect that the Federal Telegraph Company owning property along the Bay shore would be glad to coöperate in preserving the natural condition of their property.

Among field notes, Black Phoebes were reported nesting near Woodside, Mockingbirds were reported as permanent residents on Amherst St., Palo Alto, and Pine Siskins were reported appearing in flocks on the Page Mill Road. One Bush-tit nest under observation by Miss Baldwin has been completed since the last meeting.

Sixty-five members and friends were present to see three reels of moving pictures of birds of the Stanford Campus and vicinity, shown by Mr. John Price. Many interesting pictures of nest-building activities, feeding young birds, and bird banding, and pictures of twenty-nine different species, from the California Clapper Rail to the Song Sparrow, were shown.

Adjourned.—(MISS) CLARE MCGEE, *Secretary.*

APRIL.—The fourth regular meeting of the Stanford Chapter, Northern Division of the Cooper Ornithological Club, was held on Thursday, April 5, 1934, at 8:00 p. m., in room 430, Jordan Hall, Stanford University, with Dr. Willis H. Rich in the Chair and sixty members and guests present. The minutes of the March meeting were approved as read. The committee appointed to investigate the preservation of a Bay Shore Bird Refuge presented a report in a letter from Mrs. Hackley. Mr. Bixby, the Palo Alto City Engineer, and Mr. James, his assistant, have applied to the State Fish and Game Commission to have about 1000 acres on the Bay Shore declared a State Bird or Game Refuge. It was suggested by them that the Cooper Club urge the Commission to grant this request. Mrs. Hackley recommended that the Chair appoint a committee to consult with the Arden Company and with Mr. Bixby. It was moved, seconded and carried that the Chair appoint a committee of three to consult the Arden Salt Co. and Mr. Bixby concerning the matter. A motion was carried that the President should be a member of the committee.

The Secretary announced that any change of mailing address should be reported to Mr. J. McB. Robertson, Buena Park, California. Such changes must reach him by April 15, 1934, in order to be entered in the C. O. C. roster which will appear in the May Condor. Miss Alice

Baldwin was elected on a white ballot to fill the position of Secretary of the Stanford Chapter left vacant by Miss Clare McGee, who will no longer be at Stanford.

Mr. Joseph Dixon reported on Harry S. Swarth's "Birds of Nunivak Island" as a very worthwhile contribution to recent ornithological literature. It was published by the Cooper Club. Mrs. R. E. Hackley reported that the eggs of a pair of Mockingbirds hatched on April 3, 1934. The nest is located in a pyracantha bush, three feet from the ground, at the home of Mrs. de Roco, Cowper and Marion Sts., Palo Alto. A nest of the Spotted Towhee under the observation of Miss Clare McGee contained four eggs on March 25. As the nest was empty on April 5, it is assumed that it was robbed. Green-backed Goldfinches were seen building two weeks ago. Miss Elsa Dresbach told of seeing trees literally covered with Oriole nests during a recent trip into Nevada. A number of Avocets were noted three weeks ago on San Francisco Bay near the Dumbarton Bridge. One of the members reported seeing her first nuthatch for the season within the last few days. The question was raised as to why a California Towhee should peck on a window pane. One bird has been observed doing this for five or six months. The reflection seen by the bird was offered as a possible answer. Miss Alice Baldwin reported the hatching of five Coast Bush-tits on April 5, 1934, in a nest on the campus. John B. Price asked that all bird nests found in the vicinity of Stanford and Palo Alto be reported to him for purposes of photography.

The speaker of the evening was Mr. Joseph S. Dixon, who spoke on "Wild Life of Mt. McKinley National Park". Connected with the Wild Life Division of the Park Service, Mr. Dixon has spent three summers and a winter in the Mt. McKinley region. The lecture was beautifully illustrated with excellent colored slides. Much of the flora of the region was vividly described and pictured. Timber-line on the main Alaskan Range ends at 3000 feet elevation, the forests consisting chiefly of black spruce which there gives way to dwarf willows and tundra. Mr. Dixon placed the main emphasis on the bird life of the region. Most of the migratory birds are eastern, the Rosy Finch being one of the few western birds found on the coast. Many birds of Mt. McKinley were described and illustrated. Mr. Dixon spoke especially of the Wandering Tattler and the Surf-bird. The former perches in the tops of the willows and nests along the glacial streams. The nesting place of the Surf-bird was unknown until discovered by Mr. George Wright in 1926. Acting on an Indian legend, he found the birds breeding high on the Alaskan Range where only the Alaskan White Sheep live. A vivid picture was left with us of magnificent Mt. McKinley, its tremendous glaciers almost constantly veiled in clouds.

Adjourned.—ALICE H. BALDWIN, *Secretary.*

MAY.—The May meeting of the Stanford Chapter, Northern Division of the Cooper Ornithological Club, was called together by Dr. Willis Rich. Twenty members and guests were present. The minutes were approved as corrected.

Mrs. Hackley reported for the Committee on the Bay Shore Bird Refuge, using a map to point out the region in question. The committee has contacted the City of Palo Alto through Mr. Bixby, the McKay Radio Co., and the Arden Salt Co., all of which are anxious to cooperate in preserving the area as a bird refuge. All own a portion of the property. As the matter now stands, the Committee is seeking the preservation of an area which runs from Cooley Landing around Favors field, across the airport and the Yacht Harbor to South Shore Port. The marsh out beyond the Yacht Harbor has not been reclaimed; that belonging to the Radio Co. is dry. The rest of the region is made up of salt ponds owned by the Arden Salt Co. About 2000 acres are included, the majority of birds being found in the intake pond next to the open cut from the Bay. Although no contact has yet been made, it is possible that the marshes north of the Dumbarton Bridge may be included. Application to the California Fish and Game Commission will not be made until the consent of all parties has been obtained. The Secretary requested that as soon as more definite information is available the Committee send such information to Mrs. Grinnell.

A motion was carried assessing all members of the Stanford Chapter twenty-five cents a year to cover the expense of postage. It was requested that notice of meetings be published in the Palo Alto Times.

The following field observations were made. On June 10, 1933, a bantam chicken

laid several eggs in a Quail's nest in Palo Alto. These eggs were hatched by the Quail. Unlike her own chicks, the bantam chicks refused to leave the nest, and the mother was observed trying vainly to induce them to follow her. Failing, she stayed with them over night before they would leave. The following fall one bantam chicken was seen feeding with the flock of quail. Mrs. Hackley reported that the four Mockingbird nestlings under her observation had been destroyed by a cat. Dr. McCracken told of observing a flock of thirty to thirty-two Curlews in the Rifle Range near Stanford on April 29, an Olive-sided Flycatcher on May 1, and a Lawrence Goldfinch on May 3, the two latter on the campus.

Dr. Pickwell added to the report on Curlews, stating that a rancher had observed a flock five miles south of San Jose during the last week. Lark Sparrows were seen by Dr. Rich on the Sandhill Road and in the fields near the Ryan Laboratory. A juvenile Nuthatch was noted on May 3. Mr. Henri Hill told of a quail which was caught in a tree on Kifer Road. Its mate spent some time trying to feed it. Mrs. Hackley spoke of observing an adult titmouse teaching its young to peck at worms on the grass. She reported that a pair of Bush-tits nested in a sweet pea vine. It was abandoned when the weight of the nest pulled it to the ground, and a second one was built in an oak. Another pair nested on a rose bush. It was reported that a Robin was incubating on May 3. In another nest four nestlings were being fed on the same date. The member reporting has noted that in vicinities where lawns increase in number, the Robins tend to stay through the winter.

Mr. Junius Henderson, the speaker of the evening, talking on "Birds in Relation to Human Welfare," presented a wealth of interesting material. He spoke of the experimental method of study as far superior to the empirical—pointing out the advantages of the former in economic work with birds. Using many examples, Mr. Henderson showed that much foresight and research are necessary on the part of economic workers in determining whether any particular species deserves protection or extermination. The resultant upset of equilibrium in nature was pointed out in cases where a species has been destroyed in a given region. The speaker showed that a species may be harmful to man under one set of conditions and very helpful under another. All species must have enemies to prevent over-population. The speaker pointed out that non-game birds need protection by game laws and urged that the Cooper Club aid in bringing this about.

At the conclusion of the evening's talk, Mr. Lastreto gave a vivid description of the Ninth Annual Meeting of the Cooper Ornithological Club at San Diego. Several of the more important and interesting papers were mentioned. The action of the Board of Governors, incorporating the Cooper Club was noted.

Adjourned—ALICE H. BALDWIN, *Secretary.*

SOUTHERN DIVISION

MAY.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held Tuesday, May 29, 1934, at 8:00 p. m., at the Los Angeles Museum, Exposition Park, Los Angeles, with President Abbott in the chair and forty-five members and guests present. Minutes of the Southern Division for April were read and approved. Excerpts from the March and April minutes of the Northern Division were read.

The application for membership of Mr. J. N. Darling, Bureau of Biological Survey, Washington, D. C., proposed by Mr. Aldo Leopold, was presented. The recent death of Dr. Edward W. Nelson, honorary member of the club, was announced with regret by President Abbott. A meeting of the Federated Scientific Societies, under the auspices of the Nature Club, to be held June 22 to 28, at Pacific Palisades, was reported by Mr. Harris and confirmed by Miss Vignos.

While at Salton Sea this spring, Dr. Burt said he had found that the Gull-billed Terns were holding their own and that 250 pairs were nesting; White Pelicans were nesting on both islands; the Fulvous Tree-ducks were numerous but no nests were seen. He also told something of the conservation movement which is now being planned for Salton Sea. The motion was made by Dr. Miller, seconded by Mr. Harris, and duly carried, that Dr. Burt secure additional information and present same at the June meeting as a more or less formal report so that it might be acted upon by the Club. Miss Vignos asked if Cardinals were unusual for Pacific Palisades. She said two had been heard singing but were not seen. Dr.

Bishop commented on birds noted while on a recent motor trip to Hemet and into the San Jacinto Mountains. Dr. Miller told of seeing in early May, at Olancha, an unusual flight of the Long-eared Owl.

Dr. Wilfred H. Osgood, of the Field Museum of Natural History, Chicago, who was present as a visiting member, spoke of the early days of the Cooper Club when he was its first president and there were but three other members, and of how incredible it was to realize that four boys, 16 to 17 years of age, should have started an organization that has gone as far as the Cooper Club has. In closing, Dr. Osgood said that in Chicago this fall the American Ornithologists' Union would hold its meeting and he hoped there would be a good attendance from the Pacific Coast.

Motion pictures taken at San Diego when the Ninth Annual Meeting of the Club was in session, on the boat trip to the Coronados Islands, and later at Sespe Canyon where the April out-of-door meeting was held, were shown by Mr. J. R. Pemberton and greatly enjoyed by those present, and re-enjoyed when the film was run in reverse. A hearty vote of thanks was extended Mr. Pemberton for the entertainment.

Meeting adjourned.—LAURA B. LAW, *Secretary.*

JUNE.—The regular monthly meeting of the Southern Division of the Cooper Ornithological Club was held at 8 p. m. on Tuesday, June 26, 1934, at the Los Angeles Museum, Exposition Park, Los Angeles, with eighteen members and guests present. None of the officers being present, Mr. John McB. Robertson was requested to act as chairman. The minutes of the May meeting of the Southern Division were read and approved. The minutes of the May meeting of the Northern Division were read.

In regard to the conservation movement being planned to set aside a portion of the land bordering the Salton Sea, Dr. Burt reported that since the last meeting he saw Mr. McAtee of the Biological Survey and that Mr. McAtee, after investigating the situation at Salton Sea, had made a report to the Biological Survey at Washington. Dr. Burt felt that his own information was insufficient to warrant a report to the Club for formal action. The present preserve contains only a portion of the Salton Sea and none of the marginal lands, and the plan being proposed contemplates the donation of certain lands by the irrigation district provided the Federal Government will purchase certain individually owned lands. Dr. Burt stated that after such lands are acquired it will be necessary to spend considerable money for a fresh-water supply and a dike to separate the fresh water area from the salt water. Mr. Robertson suggested that it might be well to refer the question to the Conservation Committee of the Southern Division for investigation and report, this Committee consisting of Messrs. Willett, Pierce and Pemberton. A motion embodying that suggestion was made by Dr. Burt seconded by Mr. Glassell and carried.

Mr. Lamb reported seeing a flock of about 300 Wood Ibis about five miles this side of Yuma. Mr. Glassell asked why Turkey Vultures perch in such numbers around the small corn fields in Mexico; there does not seem to be food there to attract them. Dr. Warmer asked where Phainopeplas nest, stating that many of them are around his home but he has discovered no nests. Dr. Burt reported a nest of that species in an oak tree in Ojai, and Dr. Parsons reported one in a eucalyptus tree and one in a pepper tree in Monrovia last year.

Dr. Parsons told of transferring an orphaned two-day-old Costa Hummingbird to the nest of a Black-chinned Hummingbird where the one remaining young was about six days old. Both young were raised to maturity. At one stage in their development the female Black-chinned was feeding the young Costa in the nest, feeding the young Black-chinned off the nest and incubating another set of eggs in another nest. Dr. Parsons has been making daily weighings of these and other young hummingbirds. He also told of seeing in Modjeska Canyon a woodpecker (presumably a California Woodpecker) take a young wren from a wren's nest in a nest box and carry it up into a tree.

Mrs. Michener stated that she had that day trapped a molting immature Song Sparrow and a molting immature Mockingbird, the first to come to her attention this season. She also reported more nests than ever before on her home lot. Eighteen have been found so far this season.

The meeting adjourned to inspect the nest and eggs of the Mangrove Warbler which Mr. Lamb had collected.—HAROLD MICHENER, *Secretary pro-tem.*